WANDERINGS

AMONG

THE WILD FLOWERS.

AUGUST.

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1857

WANDERINGS

AMONG

THE WILD FLOWERS:

How to See and how to Gather them.

WITH

REMARKS ON THE ECONOMICAL & MEDICINAL USES OF OUR NATIVE PLANTS.

BY

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"It is pleasant to note all plants, from the rush to the spreading cedar,
From the giant king of palms to the lichen that staineth its stem."

MARTIN TUPPER.

TO

WILLIAM THOMAS THOMSON, ESQ.,

F.R.S.E., F.I.A.

OF TRINITY GROVE, EDINBURGH,

THE FOLLOWING PAGES

Are Inscribed,

IN AFFECTIONATE REMEMBRANCE

OF YOUTHFUL DAYS AND WALKS,

BY

HIS BROTHER,

THE AUTHOR.

PREFACE

TO

THE FOURTH EDITION.

"Never lose an opportunity of seeing anything beautiful. Beauty is God's handwriting—a wayside sacrament; welcome it in every fair face, every fair sky, and *every fair flower*, and thank Him for it, the fountain of all loveliness; drink it in, simply, earnestly, with all your eyes; tis a charmèd draught, a cup of blessing."

An author pens his preface to his first edition with mingled feelings. He may hope, both modestly and truly, that his work deserves the public favour, but he must know that favour does not always follow. When, however, a second and a third edition have come and gone, and a fourth is in request, he may fairly consider that his work has not been in vain.

Truly sorry should I have been had my "Wild Flower Wanderings" proved that I had failed to render a subject I truly love, attractive to others; a subject to which the good and the true, and there-

fore the beautiful, add so much. A subject, moreover, in which, as in all branches of natural history, is involved so much of instruction as well as of interest and amusement. Instruction, far beyond the mere knowledge connected with its immediate objects, instruction to the young mind in habits of accurate observation directed to special purposes, in the power of distinguishing minute differences, and in the faculty of perceiving general resemblances. Such power of discrimination is a common want, and in no way is it better supplied than by the cultivation of natural science in almost any one of its departments.

As remarked in my first preface, my little work was not sent forth as one which was to complete the reader's botanical education; its intention being rather to lead the mind to the study of the subject in deeper, and professedly more scientific works, and to present, in as interesting and comprehensible a form as possible, such a view, general and otherwise, of the vegetable kingdom, as could be illustrated by the plants and flowers of our own land.

More especially I directed my writing to interest the young mind in the observation of those lovely,

and, at the same time, most accessible of God's created works. The wild flower is the earliest thing of beauty which every child that treads a green field, or wanders along a green lane, takes to itself; it loves the flowers as it were by instinct; and this love is the best and surest portal to the memory; cultivate it, and you will find how quickly the young will learn and remember, not the names merely of their favourites, but much of their botanical history, provided only that these things are taught, not as a school-room task, full of long names and technicalities, but as the pleasant out-door lesson, in which the affections are engaged as well as the intellect. Thus may be laid in the young mind a love for the natural sciences which will never forsake it, and which may, in after years, prove a solace and resource amid the cares of life's battle, or, perchance, a real service in that battle itself. Nay, more, the time is coming fast when no man or woman will be considered properly educated who is ignorant of the leading facts at least of the natural sciences, and when the knowledge and study of these natural revelations from God will rank second only to knowledge of the higher revelation He has given us of Himself.

I send on its mission the fourth edition of my work, improved both in matter and illustration, hopeful that it may add to any little good which has been achieved by its predecessors.

SPENCER THOMSON.

GRANGEWOOD LODGE, BURTON-ON-TRENT,
June, 1857.

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Wanderings among the Wild Flowers.

"O Father, Lord!
The All-beneficent! I bless Thy name
That Thou hast mantled the green earth with flowers,
Linking our hearts to nature! By the love
Of their wild blossoms our young footsteps first
Into her deep recesses are beguiled."

——————— "By the breath of flowers
Thou callest us, from city throngs and cares,
Back to the woods, the birds, the mountain streams,
That sing of Thee!"

——————————— "Thou bidd'st
The lilies of the field with placid smile
Reprove man's feverish strivings, and infuse
Through his warm soul a more unworldly life,
With their soft holy breath."

——————————— "Receive
Thanks, blessings, love, for these Thy lavish boons,
And most of all their heavenward influences;
O Thou that gavest us flowers."

MRS. HEMANS.

How quickly are the feelings and the imagination interested in the associations connected with flowers! How easily, how early in life, do the young wild blossoms "link the heart to nature,"—form, as it were—

"A flowery band to bind us to the earth!"

And yet, strange is it, no sooner do we speak of the intellectual study of this fairest portion of God's creation, than people generally think of something dry and unattractive; they seem frightened at the very name of *botany*, which conveys to their minds little else than an idea of long catalogues of "dreary" Latin names. True it is that the *scientific* study of botany does involve a knowledge of a good many apparently learned terms; but it does so for the simple reason, that in such lavish profusion has He who gave us flowers "mantled" with them the green earth, so diverse has He made the forms and vestiture of these "bright children of the sun," that those who study them have had to find names for some eighty or ninety thousand different kinds or "species;" names, too, which shall not merely be understood in a limited locality, but which shall pass current among men of all civilized nations and tongues. Hence plants and flowers, even the most familiar, must all have their botanical names, and for this purpose the Latin language is the most convenient, to distinguish them in their places in the great system of plant arrangement, well named the "Vegetable Kingdom."

These long names, therefore, which appear so terrible, are really no essential part of the botanical lore of our British wild-flower gatherer and student. We could take all our wanderings amid the woods and glades of England, over the hills and by the

mountain burns of Scotland, without troubling one of them, or finding them stand in the way of our study of any wildling we pick up. You need have nothing to do with them unless you like, and yet, we venture to say, that when you have got interested in botanical study, you will find these names so convenient, that you will then think it no trouble to learn and to use them. If you really love wild flowers, even their hard names will gradually fix themselves in your memory; and once in, they do not very readily escape.

Nevertheless, in our little volume, we promise you shall find as few of these learned terms as possible. Its intention is not to speak of botanical science, but of wild flowers; not to lead you into the microscopic intricacies of vegetable anatomy, but simply to deal with the outward forms and distinctive features of our floral favourites, to *Show you how to see them*, how to appreciate those varied characters which distinguish "classes," "families," and "species" of plants from one another; and which, though apparently separating the vegetable kingdom into diverse parts, actually *give rise, by their combined differences*, to the beautifully harmonious whole which it presents to us, whether we view it with the eyes of the scientific student, or with those of the admirer of nature's beauty; whether we give our mind to learn how

"The folded leaf is woo'd from out the bud,"

in early Spring, or the down-clothed seeds wafted abroad by the winds of Autumn; or whether, taking a wider view, we seek to appreciate the beauty of the extended landscape, which owes so much to the varied forms and glowing colours of tree, and shrub, and flower.

Wild Flowers.

PART I.

ORGANS OF PLANTS.

THE COVERING, SKIN, OR EPIDERMIS OF PLANTS.

Plants, like animals, have a skin, that is, have an outward covering, which protects and assists to bind together the internal structures. Generally, this skin, which is composed of two layers, is extremely thin, as we find it on most leaves, and is usually colourless, allowing the varied tints of the parts beneath to shine through it. In most plants the skin or *epidermis* is simple; but in some, such as the grasses, horsetails, &c., it contains silica or sand substance, and from this derives peculiar hardness.* The hard, shining surface of straw owes its character mainly to the presence of this silica. In the bamboos it occurs in masses called tabasheer. Moreover the plant covering is not impervious, but is pierced with numberless minute openings called *stomates*.—Fig. 1. These openings communicate

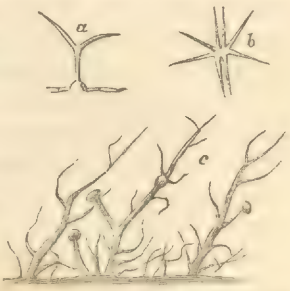
* The use of what are called Dutch rushes in polishing brass, &c., depends upon their containing a large amount of this silica, or sand substance, in their *epidermis*.

with the interior parts of the plant, and permit the interchange of gases and vapours with the surrounding atmosphere: they are, in fact, the breathing mouths of plants. Capable, too, are they of shutting up in dry weather, and so checking the escape of the vegetable juices, and of opening to receive grateful refreshment in a moist atmosphere. As we might expect, these stomates would be of but little use on roots, or on plants immersed in water, and there we scarcely find them; they are most numerous on the under sides of leaves; a tolerably good microscope, however, is required to see them. Plants, moreover, which are natives of very dry and parching climates have but few stomates; so that they do not readily part with their moisture: of this the succulent cactus tribe is a well-marked example. But the plant covering has *appendages* much less microscopic than these curious little stomates; occasionally it is smooth, but very often it has a clothing of hairs of all kinds, from the softest down to the stiffest bristles, merging into the spines and prickles which arm our roses and brambles, or into the stings of the nettle. The disposition and form of the hair coverings of plants often afford us valuable distinctions. Pluck a piece of chickweed, or of the germander speedwell, *Veronica chamædrys*. On the stem of the first you will perceive alternate lines of hairs, on that of the second opposite lines of hairs, both well marked characters. Most

1. Portion of the epidermis or skin of a plant, highly magnified, showing the irregular-shaped flattened cells of which it is composed, and the stomata, or breathing pores—*a*, *a*.

hairs perhaps are simple, but many are varied; some are star-shaped—Fig. 2 *b*—others forked—Fig. 2 *a*—others glandular—Fig. 2 *c*.

The stains and markings of the epidermis cannot be called appendages, but they are characters, often of much value in determining plant distinctions. For instance, the true hemlock has a stem perfectly destitute of hair appendages, but strongly marked with dark stains; this character alone distinguishes it from every other British species of the extensive family—the *Umbelliferæ*—to which it belongs.



2. Varieties of plant hairs—*a*, forked hair—*b*, star-shaped hair—*c*, branched and glandular hair of Gooseberry.

Having looked well to our plant covering, we must go to what very few incipient botanists trouble themselves about—

THE ROOT.

And yet roots are often beautiful—yes, beautiful; oftener still, remarkably characteristic—very varied in form. Although the root is usually the part of the plant by which it is fixed in the ground, and by means of which it draws up nourishment, the arrangement is by no means constant; some of the orchis family, and others, do not have their roots in the ground at all, but possess what are called aërial roots, which draw nourishment from the atmosphere; others develop their roots in the air in the first

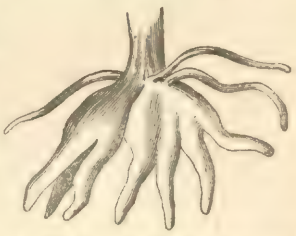
place, although they subsequently become fixed in the earth. Water-plants shoot out their roots in the midst of the element in which they grow.

Roots are classed as annual, biennial, and perennial, according as they last, for one, two, or more years. A root may be said to consist of two parts, the body, or, as it is often called, the *caudex*, and the *radicles* or fibres. Some roots, like the carrot, dandelion, &c., are simple, and terminate in a point; others terminate abruptly, as in the devil's-bit scabious, mentioned among our September wild flowers; whilst some are globular, like the turnip. Many roots, like those of the majority of the grasses, and the sedges, are composed solely of fibres. Perhaps, however, the commonest form of root is the branched, such as we find possessed by trees and shrubs generally. Of the curious roots, that of

3. Root of the Ipecacuanha—annulated or ringed.

4. Root of Bird's-nest Orchis, composed of many fleshy fibres—a fasciculated or bundled root.

the ipecacuanha—Fig. 3—is not the least so. It is annulated or ringed. Another form of root, the fasciculated or bundled—Fig. 4—we see in the bird's-nest orchis, approaching the tuberous roots of others of the orchis species. Here is one—Fig. 5—the palmated root of the common *Orchis maculata*, or spotted-leaved orchis. Properly, however, we ought to speak of these tubers, and of others like them, such as those of the potato, rather as appendages to the root than the root itself. Some of our readers, perhaps, are ready to remind us that we have forgotten to speak of bulbs; but for these we must refer them to our next section, the stem, to which, perhaps to their surprise, they will find these apparent roots truly belong; for as there are aërial roots, so are there underground stems.

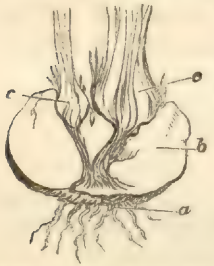


5. Root of the Spotted Orchis, with palmated (hand-shaped) tubers.

THE STEM.

The stem is that portion of the plant which, as a general rule, rises from the root at the surface of the ground, and supports the leaves, flowers, &c. It is not, however, an essential part of plant existence, many species, such as the primrose, plantain, &c., having no apparent stem whatever, whilst others possessing bulbs, like the onion or lily, or solid corms, like the crocus, are said to have their stems under ground. Fig. 6 is a section of

the common crocus, of which *a* is the fibrous root—*b* the corm, which may be taken to represent the stem, and *c*, *c*, buds springing from that stem, and unfolding into leaves and flowers. Another form of stem usually considered as an underground one, is such as we find in the lily of the valley, or more conspicuously in the iris—Fig. 7.



6. Underground stem, or, as it is commonly called, bulb, or root, of the common crocus—*a*, proper fibrous root—*b*, the corm, which properly represents the stem—*c*, buds, consisting of leaves and flowers.

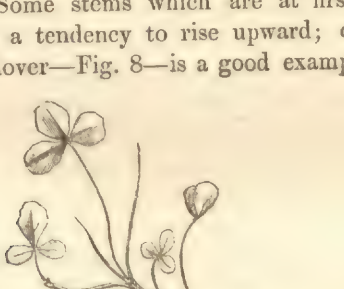
To proceed to what our readers will have less difficulty in recognising as stems, we find those which rise above the ground presenting us with almost every conceivable form and appearance, from the slender threadlike support of the "slight harebell," to the trunk of the gnarled and knotted oak, or the light elegant shaft of the oriental palm. How greatly this almost infinite diversity of stem and branch*—for branches are but secondary stems—adds to the beauty of natural scenery, it is almost superfluous to remark, and our readers may well imagine how valuable and distinct must be the characters which botanists derive from

7. Under ground horizontal stem of Iris—1, stem—2, roots.

* Refer to Figs. 84 to 113.

the stems, as signs of difference between one plant and another.

One great division among stems is into herbaceous or green, and woody. The stem of an annual plant or of a one-year's shoot is always herbaceous, that of two-years' growth becomes woody; hence, like roots, stems are annual, biennial, and so forth. Stems vary greatly in their directions—here is another source of difference; some, like the pine tree, are *erect*, shooting straight upwards: among smaller plants, the mints and the foxgloves are good specimens of the straight stem. Some, unable to support their weight, lie on the ground, like the ground-ivy; they are *procumbent*. Some of these procumbent stems send down roots, and are then *rooting*. Some stems which are at first procumbent, show a tendency to rise upward; of this the common clover—Fig. 8—is a good example. Such



8. Ascending stem of common Dutch Clover.

stems are *ascending*. Then we have the well-known *trailing* stems of the hop, of the honeysuckle,

and convolvulus or bindweed: differing from these are the *climbing* stems of the vine, of many of the pea species, or of the now well-known canary creeper; the former, the vine, the vetches, &c. supporting themselves by means of their tendrils, the latter climbing by means of the graspings of its leaf and flower stalks. The *incurved* stems of the bramble afford us another example of stem variety as regards direction. Other stems simply droop, either bending stiffly as it were, or with the gracefulness which we see in some of the grasses, such as the brome, or the melic grass. A few seem undetermined what course to take, and so follow the *zigzag*, like a species of clover, the *Trifolium medium*. Again, stems may be simple, like that of the foxglove; or they may be branched, that is, sending out secondary stems; and in the distribution of these branches we find another source of distinction. There is the simply-forked stem, dividing itself into pairs of branches, or the many-branched. In some cases these branches come off singly, and apparently without regularity; in others, by regular alternations, and again by twos opposite each other. Occasionally a number of branches shoot out from around the same centre of the stem in a *whorl*. Then we must remark what position the branches hold with respect to the stem—whether they are erect, spreading, or, like those of some of our most graceful trees and shrubs, pendent or drooping. Runners, such as we find in the strawberry—Fig. 94—and many other plants, we may look upon as long weak stems or branches, unable to support their own weight, and resting upon the ground. Exactly

the opposite of these we find on the common thorn, and other spinous plants, the prickles of which are but short, stiff, undeveloped branches, giving their own special character to the plant which bears them. Very different, however, are these thorns from the prickles of the rose or of the brambles: of this, the most superficial examination will be sufficient to convince any one. The thorn is connected with the wood; the prickle is simply an appendage to the skin or epidermis.

Additional plant characteristics do we find furnished to us by the surface of stems and branches. Some are perfectly smooth, some clothed with hairs of various degrees of softness or stiffness. Some stems, as that of the common hemlock, are spotted, or, like the toothwort, or broom-rape, scaly; on others the bark is rough and wrinkled, even on the small branches. Another variation presents itself when a stem is winged, as it is in some of the vetches—Fig. 9,—or sheathed, as in the grasses—Fig. 113. Next we have to look to the form of stems, some being cylindrical or nearly so, others flattened or compressed, many presenting us with angles more or less numerous. There is the triangled, and often very sharp-angled, stem of the sedges—Fig. 111—the square four-angled stem of the figwort or scrophularia—Fig. 105—and other plants; or those of the gentian, or of the starwort, with more angles still.

9. Winged stem of a Vetch.

Lastly, we have stems knotted as in the brittle geranium, jointed or knotted as in the grasses, which last also offer us examples of hollow or fistulous stems. But enough: we have shown how many and how distinct characters may be derived from the stems of plants; and our readers must—and nothing is easier—both verify and extend the knowledge for themselves. Scarcely two will they find alike; the variety is infinite as it is perfect, telling of—

> "The well-ordained
> laws of Jehovah."
> "The wonderful all-prevalent analogy that
> testifieth one Creator
> The broad arrow of the Great King carved on
> all the stores of his Arsenal."
>
> MARTIN TUPPER.

THE LEAVES—THE BUDS.

In the tree or shrub, bare even as we see it in winter, there are all the points which have hitherto engaged our attention—the root, the stem, and the branches; but there are also the buds, which hard and lifeless as they appear when

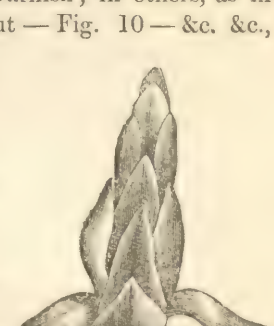
> "Winter winds are piercing chill,"

nevertheless contain closely packed up, and well protected, the future leaves and branchlets, the flowers and fruits, destined to burst into bloom and being, when

> "Winter has passed with its frowns away,
> And the beautiful Spring is coming."

Most buds have a general external resemblance, but they differ considerably in the internal arrangement

and packing of their contents. As all are aware, these contents are either leaves or flowers, or both, or at least their germs, which during winter are so well protected from the nipping frost, or rotting damp, by the covering of hard brown-looking scales which so closely invests them. Overlapping one another — Fig. 10 — these scales are assisted in their protective office in some cases by a covering of a hard dry varnish; in others, as in the poplars, horse chestnut — Fig. 10 — &c. &c., from being glued together by a sticky resinous substance; whilst, in not a few instances, they have a warm woolly lining. Within these carefully-constructed coverings lies the future foliage—at present we refer only to leaf-buds —of the tree, packed most closely, most beautifully, and in very varied forms, according to the nature of the plant which bears it. Take any bud swelling to the bursting in spring, cut it both across and lengthwise, and you will at once gain an idea of the disposition of the *foliation* or *vernation*, as it is called, of the future leaf. If your bud belongs to the oak, the rose, or various other plants, you will find the leaves doubled side by side, *conduplicate*; if it claims parentage from the maple, the lady's-mantle, or the birch, the leaves will lie



10. Leaf-bud of Horse Chestnut, showing the overlapping, imbricated scales by which the young leaves are protected.

plaited up like a fan. In some plants, the leaves, as it were, embrace one another; in others, they are rolled inwards, or, as in the primrose or cowslip—Fig. 69—outwards or backwards. In the fern tribes we find the very curious and beautiful *circinnate* or gyrate mode of foliation—Fig. 11—

11. Hart's-tongue Fern, showing the peculiar gyrate mode of unfolding of the *fronds* or leaves.

in which the whole leaf or frond, as it is called, and at the same time every segment of it, is rolled inwards upon itself. Many other modes of leaf-folding will the careful examiner discover, and he should mark them, not only as valuable distinctive characters between plants of different tribes, but as examples, and beautiful examples, of His handiwork "who hath made all things well."

The packing of the flower and fruit bud, named by botanists its *æstivation*, will be considered in a future section.

THE LEAVES.

Few are there who cannot appreciate the beauty at least, as the gaze falls upon some stately tree, "which proudly spreads the bough" in the full flush of its summer leafiness, or as the eye wanders over the foliage of every form, and of every shade of green, which decks the broad bosom of the earth at all times: but how few, comparatively, know the use for which this enormous breadth of leafy expansion is designed, for what purpose it is exposed to the influence of the sun's heat and light, and to the vicissitudes of our ever-changing atmosphere! Few are aware that every perfect leaf is an organ of respiration, a breathing mouth of the plant to which it belongs; that through the little pores or *stomates* of its surface—see Fig. 1—constant changes and interchanges are going on with the surrounding atmosphere, whereby that atmosphere is continually purified, kept fit to support animal life, whilst at the same time it is made to yield to the plant materials for its continued growth. Through the leaves, too, pass all the peculiar juices by which different plants are characterized; exposure to the influence of light and air in the leaf being requisite before the sap can become the *proper juice* of the vegetable; that is, can possess the odour, flavour, medicinal or nourishing properties which are peculiar to the individual. Some plants, it is true, such as the cactus tribe, do not possess true leaves; but in such cases the duties of the leaf are performed by the green stem.

A leaf, as all can see at once, is composed of two different structures—the ribs or veins, and the

vegetable substance lying between them. The term rib is applied to the more prominent markings, the central—see Figures—being called the midrib; the less conspicuous markings are the veins. Moreover, it can scarcely have escaped the notice of the least observant, that throughout plants generally, the ribbing or veining is arranged according to two very distinct plans. In one set of plants, more especially in those which are common to temperate climates, the veining is netted, or reticulated, or branching—Fig. 12, &c.—as we see it in the elm, the oak, the rose, and, indeed, in the majority of our British native plants. Another division of plants, such as the grasses, the lilies, &c., we find characterized by the ribs or veins running directly parallel throughout the leaf—Figs. 18, 108, 111, 113. In tropical countries a considerable proportion of the vegetation is composed of plants and trees with such parallel veined leaves.* The outward marks upon the leaves are in themselves valuable and ready distinctions, and greatly add to the beautiful diversity of foliage; but to the mind of the botanist, they convey more than a mere surface character; they indicate the division of the *flowering* vegetable kingdom into two great sections, each distinguished by peculiarities which run through its members, which commence with the seed, and which stamp the stem, the leaf, the flower, till they end in the seed again. From the form of the seed, these two great sections of flowering plants are named. In

* The palms, the bananas, the aloe, the bamboo, all belong to this section of the vegetable kingdom, and associate with them the beautiful and varied orchis family, of which we have many species in our own land.

plants with netted veins the seed has two lobes, or, as they are called botanically, *cotyledons,* as any one may see who opens a bean or pea—hence such plants are classed as DICOTYLEDONOUS. In plants with parallel veins, on the other hand, such as wheat, oats, and barley, the seed has but one lobe or *cotyledon;* hence such are named MONOCOTYLEDONOUS.*

It may readily be comprehended, that the immense variety of form, substance, position, &c., presented by leaves, must furnish botanists with many and valuable distinctive marks; at the same time, it must be evident that these distinctions necessarily call for a long catalogue of terms—too long, by far, for us to enumerate here—but yet one which ought

12. Leaf of common Nettle, with branched or reticulated veins. 1, the blade or limb—2, the petiole or leaf-stalk—3, the base of the leaf—4, the apex—5, the margin—6, the axil. The leaf is heart-shaped, acute, with a deeply toothed or serrated margin.

* See chapter on the Classification of Vegetables.

to be learned, generally at least, by those who desire to make any real progress in botanical lore.

Most leaves are composed of two distinct parts, the broad expanded portion, or blade, or limb—Fig. 12, 1—and the leaf-stalk or *petiole*—2. Some leaves, however, have no stalk, as at Fig. 15, and then they are called *sessile*, or sitting as it were close to the stem. The portion of the leaf next the stem—Fig. 12, 3—is designated the *base;* the opposite extremity—4, the *apex*. The boundary—Fig. 12, 5—is the *margin* of the leaf; and the angle of junction with the stem—6, the *axilla*, or axil. At the base of the leaf-stalk or *petiole*, and sometimes running down the latter, there are frequently found certain leaf-like appendages—Figs. 19, 91;—these are named *stipules;* they often afford valuable distinctive characters. They are very prominent in the pansy, and in many other plants, and take various forms. In the example shown—Fig. 19—the leaf of the *tuberous bitter vetch*, they are half-arrow shaped. Some leaves which are without stalks, not only sit quite close to the stem, but embrace it in various ways; in some cases completely surrounding it in a leafy cup—Fig. 20—in others furnishing it with leafy wings, which run down it from one leaf to another—Fig. 21. The attachment of the leaves of parallel-veined plants is often what is called *sheathing*, as we see in the grasses—Figs. 18, 113—in which the leaf springs from a sheath, entire or split, which embraces the stem for some distance.

The form of a leaf is of course determined by its

margin. Some, like those of the grasses, are *linear* —Fig. 18. Some—Fig. 13—are lancet-shaped; others have the base heart-shaped—Fig. 12—the general outline of the rest of the leaf varying from round oval to even linear. At Fig. 14, we have the acutely oval leaf; at Fig. 16, the palm-shaped; at Fig. 17, the arrow-shaped. We might multiply greatly our numeration of the varieties of simple leaves; but the examples already given will serve to illustrate how the form of the leaf is employed by botanists in the description and distinction of plants. There are yet, however, other means of distinction to be drawn from

13. Lancet-shaped Senna leaf with the margin entire.

14. Oval Senna leaf, acute at the apex.

15. Leaves of Speedwell without petioles or footstalks, called sessile leaves.

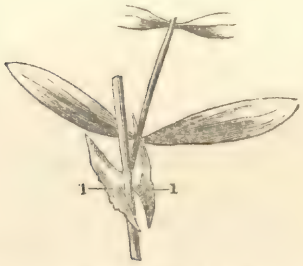
the leaves. Take any number of different specimens and examine their margins, scarcely two will you find alike. Some will have the margins entire—Figs. 13, 14,—in others it will present just perceptible notching—Fig. 23,—whilst in another set this notching or saw-toothing is much more evident, though still minute—Fig. 16. Some plants

16. Palmate or palm-shaped leaf of Castor oil.

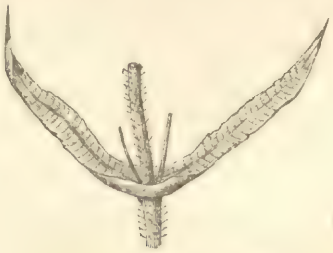
17. Arrow-shaped leaf of Arrow-head.

18. Linear leaf of grass with parallel veins, and with sheath, 1, to the stem, 2.

like the common nettle—Fig. 12—have their leaf margins regularly saw-toothed—*serrated,* as it is called. The rose-leaf presents us with another and very beautiful example of this sharp serrature. The cuttings of the leaf margin, however, are not necessarily sharp; at Fig. 15 we have an instance of leaves in which they are rounded. In other cases, they are not only notched, but they are curved and crimped in various ways. Then, again, we find the leaf margins, as in the thistle, the holly, &c. &c., armed with sharp spinous projections, whilst some plants, like the primroses—Fig. 64—curl the margin back. Besides



19. Portion of compound leaf of Bitter Vetch. 1, 1—Half-arrow shaped stipules.



20. Connate leaves of common Teazel.

the *margin*, the *apex* of the leaf also presents us with often well-marked characters; it may be rounded, or blunt, or sharp-pointed; it may end in a curled tendril, or in some few cases in such a curious appendage as we see in the pitcher plant—Fig. 27. Moreover, as all know, leaves differ in substance: some are fleshy,

21. Decurrent leaf of Thistle.

like those of the houseleek; some limp and soft, like the leaf of henbane, &c.; some leathery, like the oak, or stiff, like the holly.

Position, form, marginal cutting, substance, all add to the never-ending variety of leaves; but to these we have yet to add the variety of surface which gives so much character to plants, whether we regard them with the eye of the botanist, or with that of the simple lover of nature. How bright is the polish of the holly's "gay green leaf;" how soft with downy hair that of the downy woundwort; how curiously covered with glands that of the sundew; how rough with bristles the surface of the borage tribe! But why go on with an enumeration which would occupy our volume? To our readers we say, Go, take practical lessons. None more accessible will you find in this world: for the

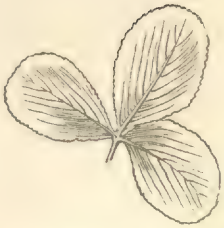
> "Flowers that spring by vale or stream,
> Each one may claim them for his own."

Take the great volume of the Book of Nature, that book ever spread open before us by Him who is its Author; go straight on, gather leaf after leaf, examine, compare, and ponder over them. Ponder how well

> "The Almighty Maker has throughout
> Discriminated each from each, by strokes
> And touches of his hand, with so much art
> Diversified, that two were never found
> Twins at all points."

Thus, and thus only, will you gain practical knowledge of, will you acquire real interest in, the study of plants. When you have acquired that real in-

22. Pinnated compound leaf of Ash-tree—1, petiole or midrib—2, leaflets, jointed at 3 to petiole.



23. Radiate compound leaf of Clover.

terest, the long enumeration of varied forms will cease to weary; it will be forgotten as a theoretical study as it merges into the practical knowledge of the subject.

When the cutting of the leaf margin goes far into the substance of the leaf—Figs. 24, 84—so as almost to divide it into different portions, it becomes a partite leaf; but when the leaf is cut quite down to the midrib, forming as it were separate leaflets—Figs. 22, 88, 91, 98—we have the

24. Partite leaf of Burmarigold.

COMPOUND LEAF,

as distinguished from the simple leaves which have hitherto engaged our attention.

Compound leaves, although very varied in form, belong either to the same class as the leaves of the pea tribes—Fig. 19—or of the ash—Fig. 22—they are *pinnated* leaves; or they rank with the class which includes such as the horse-chestnut, the potentillas, &c., in which the leaflets radiate as it were from a centre. Pick up a fallen ash-leaf from the heap which strews the path after the first real frosty night of October, and you will have an excellent specimen of a compound leaf broken off at its joint with the main stem, and with its numerous little leaflets readily breaking off at their jointed attachments to the central *petiole* or *midrib*. The umbel-bearing plants, such as the hemlock, offer us many specimens of extremely compound leaves. Fig. 25 is a specimen of the compound leaf of an umbelliferous plant; but is not, like some of the leaves of the family, doubly and trebly compound.

25. Leaf of an Umbelliferous Plant.

We must not bring our brief chapter to a conclusion without noticing certain leaves that are scarcely true leaves, and yet look extremely like them—we mean the first, or seed, or cotyledonary leaves, with which many plants first make their appearance above-ground. These leaves do not resemble the true leaves of the plant, but, having served the purpose for which they were designed, of nourishing and protecting the first tender shoot, they wither and die. At Fig. 26, we see the seed leaves and first true leaves of the common white nettle, differing greatly from each other; in the March wild flowers will be found a different example of the same fact.

With the subject of leaves, we conclude the consideration of what are classed as the conservative or nutritive organs of plants. The root,

26. Seedling of common Dead Nettle—1, 1, the seed leaves or cotyledonary leaves—2, 2, the proper leaves of the plant.

the stem, the leaves, are devoted to the preservation and development of the individual plant to which they belong; the whole plant itself tending to the development of the reproductive organs, by which the perpetuation and multiplication of the species is secured. Our next section is devoted to the consideration of these reproductive organs. We must not, however, part with our leaves, without noticing one of their most important fulfilments in the economy of nature, which is not sufficiently recognised. Leaves, it has been observed, throw off into the atmosphere a large amount of water; this water having been drawn up, by the roots of trees especially, from considerable depths. We can well imagine how great must be the amount of moisture furnished to the surrounding air by the leaves of an extensive forest, and we may understand how the unwise, indiscriminate clearing away of forests may tend to deprive a country or district of much of its natural humidity.

27. Curious leaf appendage of the Pitcher Plant.

REPRODUCTIVE ORGANS OF PLANTS.

THE FLOWER AND THE SEED.

"There lives and works
A soul in all things, and that soul is God.
The beauties of the wilderness are His,
That makes so gay the solitary place,
Where no eye sees them."
"He"
"in its case,
Russet and rude, folds up the tender germ
Uninjured, with inimitable art;
And, ere one flowery season fades and dies,
Designs the blooming wonders of the next."

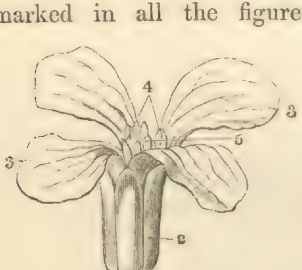
COWPER.

THE reproductive organs of plants are composed of certain parts essential to the production of the seed. In themselves these *essential parts* are extremely simple, the gay colourings and beautiful forms of what is usually called a flower being by no means necessary to constitute a perfect blossom to the eye of the botanist.—But of this more hereafter.

THE FLOWER-CUP, OR CALYX.

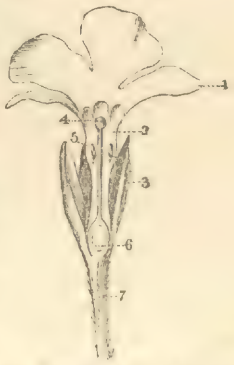
Our present lesson, like all other botanical lessons, must, to be worth anything, be a practical one. Let us take a few simple flowers, living ones if possible; but in case these should not be forthcoming with some of our readers, and at all seasons, we must give their portraits. Take the wallflower —Fig. 28—for one; the primrose—Fig. 29—for another; the loosestrife—Fig. 30—for the third;

and the gorse flower—Fig. 31—for a fourth. Examine the outside of each of these flowers. You will observe that each has a part or parts, well marked in all the figures, which surround the rest of the flower. In the primrose it is green, and in one piece; in the loosestrife it is also green, and in one piece, but deeply divided into five divisions. In the gorse there are two all but complete divisions, more yellow than green; and in the wallflower the divisions are four, and deeply coloured. In all these instances, the part we have described is the flower-cup, the calyx of botanists, the outer enveloping portion of the flower. Multiply your observations on flowers generally, and you will find that, almost without exception, they have this outer part or calyx in some form or other. At the same time, you must not expect to find it always as distinctly marked as it is in the instances pointed out above. In the majority of flowers it is easily enough distinguished by its position, and by its green leaf-like colour; but in some, especially among the parallel-veined leaf plants, such as the iris, the snow-drop, the crocus—Fig. 58—the calyx is quite flower-like. In such plants it is often included in the term *perianth*. By botanists the



28. Blossom of common Wallflower, cross-like, or cruciform in shape—1, peduncle or flower-stem—2, calyx or flower-cup, in four distinct parts or sepals—3, 3, petals, four in number, composing the corolla—4, stamens—5, pistil.

flower-cup is considered to be made up of a certain number of separate divisions or parts, which are called *sepals*, these sepals being either distinctly separate, as in the wallflower, or united into one, as in the primrose; in the latter case the calyx is spoken of as *monosepalous*, or one-sepaled. The expression, however, is not perfectly correct; for the one-sepaled calyx does not consist of one part, but of several joined together. The existence of these parts is generally indicated by some approach to division. In the primrose—Fig. 29—the five parts are indicated by the five-*toothed* flower-cup; but in the loosestrife—Fig. 30—they are much more strongly marked in five deep divisions, constituting a five-*partite* calyx. In the wallflower—Fig. 28—the sepals are completely separate.



29. Vertical section of blossom of common Primrose—1, the limb of corolla, which is in one piece—2, the tube of the corolla—3, the calyx or flower-cup, in one part or sepal—4, the pistil—5, two of the five stamens—6, the ovary or seed-vessel—7, the peduncle or flower-stalk.

30. Back view of blossom of common Loosestrife, deeply divided into five segments, partite—1, calyx—2, 2, corolla—3, peduncle.

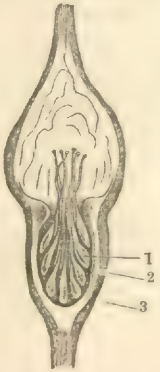
31. Blossom of common Gorse or Whin—1, calyx or flower-cup, of two parts, lips or sepals—2, 2, petals of the corolla—3 curved pistil.

In most plants, perhaps, the flower-cup is regular in form, but not in all. In the labiate plants, for example, the class to which the white and red dead nettles belong, the calyx is irregular—Fig. 32.

32. 1, Irregular-shaped calyx or flower-cup of a Labiate plant.

Some flowers you will examine in full bloom, and yet you will be unable to detect any calyx at all, for the good reason that when the blossom is fully expanded it is not there, it has been cast off. The familiar garden eschscholtzia, which may be seen any summer morning throwing off its extinguisher-like caps, or calyces, from its expanding gay yellow blossoms, is a good example. Another we have in our own wild poppies, which separate their flower-cups, or, rather, in their case, flower-caps—Fig. 33—as the blossom expands.

33. Bud of common Poppy casting off its *deciduous* calyx—1—composed of two parts, or sepals.



34. Section of Rosebud, showing the calyx—2—adhering to and forming a part of the ovary or seed-cup, 3—the latter containing the seeds, 1.

In most plants, perhaps, the calyx withers with the flower; but in some it adheres more or less completely to the seed-vessel, and not only does not wither and fall off, but continues to grow with the increase and growth of the seed-vessel, and eventually forms part of the fruit, as it does in the apple or pear, or in the hep of the rose, as shown in Fig. 34, where 2 is simply the calyx adhering to the seed receptacle contained within. One singular form is the bladder calyx, which looks as if blown up by air; the most familiar example of this form among our native wild flowers is seen in the bladder campion—*Silene inflata.*

Many pages might we fill with descriptions of the different forms of calyx; but again we say, go to the Book of Nature, pick blossom after blossom, and compare each with the other. This little work is not meant to spell out any part of that great Book of God for its readers; it simply aims at showing them how they may spell it out for themselves—how they may truly *see* the things they look at:—many there are who look at things, but comparatively few are there who see them—few who feel them—few are there to whom

> "There is a tongue in every leaf,
> A voice in every rill."

We would make the few the many.

THE FLOWER, OR COROLLA.

Again we return to our practical lessons, and have recourse to the living flower, or to its picture if the original fails us. The corolla, that which in

the eyes of people generally constitutes the flower, is the floral envelope lying next within the flower-cup or calyx; the divisions of this floral envelope being known to botanists by the name of *petals*, a term corresponding to the *sepal* division of the calyx. The bright yellow petals of the buttercup, the pink petals of the wild rose—the blue, bell-like, conjunction of petals which forms the harebell blossom, are all the corollas of their respective plants. In plants, such as the buttercup, the rose, &c. &c., in which the corolla is made up of a number of separate petals, the term *polypetalous*, or many-petaled, is applied to it. In those, like the harebell, in which the corolla is in one piece, it is called *monopetalous*, or one-petaled,—a term, however, which is scarcely correct, seeing that such corollas are not truly one-petaled, but are actually formed by the conjunction of a number of petals, of which, moreover, the points of union are often well marked.

As in most instances the calyx of the flower is green in colour, leaf-like, and comparatively inconspicuous, so, generally, we find the corolla bright in hue, showy, and often fragrant. Not always, however, is it so distinguished or distinguishable; for in some plants, as the ivy, or its relative the moschatell, in the lady's mantle, and various others, the corolla is greenish and insignificant. In other instances, as in the hellebores, whilst the corolla is small and scarce noticeable, the calyx is large and conspicuous. In others of the ranunculus family—to which the hellebores belong—the calyx is still more conspicuous from its gay colour, such as we find in the

beautiful globe flower, in the anemones, &c. These, however, are exceptions; generally speaking, the corollas, the flower petals, are the ornamental part of the blossoms; to them we mostly owe the beauty and fragrance of these lovely creations, these bright revelations of pure benevolence, which make the earth

"All Eden bright,
With these her holy offspring,
Creations of the light;
As though some gentle angel,
Commissioned love to bear,
Had wandered o'er the greensward,
And left her foot-prints there."

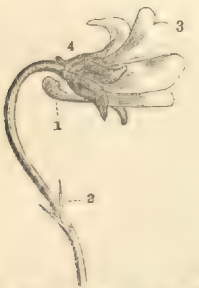
Before going farther, mark the fact in any flowers which you gather, that the petals of the corolla are not opposite the sepals of the calyx, but alternate with them. Now take our old friend the buttercup: you find its petals perfectly simple—Fig. 35—so also

35. Petal of common Buttercup, showing nectary—1—at its base.

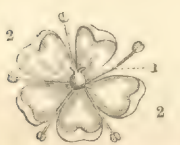
36. Single petal of common Wallflower—1, the limb—2, the claw.

in the rose, in the poppy, &c. Now take the wallflower—Fig. 39—you will find it has four distinct petals, but different from those of the rose, or of the buttercup. These petals have two parts, the limb —Fig. 36, 1—and the claw, 2. Similar petals will you find in the pink, carnation, and many other flowers.

How much might we say respecting the varied forms of the petals! Like the leaves, scarce two do we find alike. Differing in general outline, so do they in the cuttings of their margins. Many are perfectly even; some are simply toothed, as they are in the pinks; some, like those of the campions, are deeply cleft; and in a near relative of the campions, the bright-coloured but forlorn-looking ragged-robin, you find the petals cut in all directions, as if some fairy folk had gone at them hap-hazard with their scissors as they expanded. The now well-known garden Clarkia is another instance of petals deeply cut. Some plants, like the columbine, the larkspur, or the violet, have their petals, or some of them at least, rolled up into a spur-like appendage — Fig. 37. In many of the umbel-bearing plants the petals end in a point, which is turned inward, or *inflected*— Fig. 38.



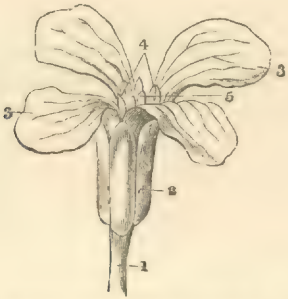
37. Blossom of common Sweet Violet. The corolla—3—composed of five petals, the lower one of which is extended into a spur, 1. The calyx—4—of five sepals. The peduncle or flower-stalk, having two bracts, 2.



38. Blossom of an Umbel-bearing plant, having five petals—2, 2—each with an inflected point; five stamens, and a pistil with two styles.

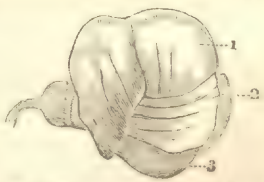
Varied as blossoms are by the form of their petals, not less so are they by the disposition or

arrangement, which in some is of the most regular character, in others of the most irregular. First examine the blossom of the wallflower—Fig. 39—or of the wild mustard, charlock, or any similar



39. Blossom of Wallflower. Peduncle, 1. The calyx, 2. The petals of the corolla, 3. The stamens, 4. The pistil, 5.

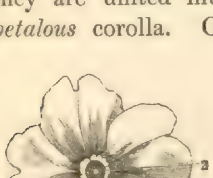
plants; mark their regular, cross-like arrangement, from which the family to which they belong, the Cruciferæ, derives its name. Take up the rose, the apple blossom, the potentilla, the strawberry, and you will find them exhibiting another general flower form, the *rosaceous*—also regular. Refer to the pea tribes; look at the flower of the broom, or of the gorse —Fig. 31 — or of the common pea — Fig. 40, also Fig. 91—and you will find different petals,



40. Papilionaceous or butterfly-shaped blossom of common Pea. Corolla, composed of five petals; 1, the standard, of one petal—2, the wings, of two petals—3, the keel, of two petals.

of very different form, combined to form an irregular blossom, that is to say, one which can only be severed into two equal halves by one way of cutting. Examine the violets, and you will find similar irregularity, but under arrangement very different from what we find in the pea.

Hitherto we have confined our attention to blossoms which are *polypetalous,* that is, in which the petals are separate: no less varied are those in which they are united into one piece, forming a *monopetalous* corolla. Our old famliar friend the primrose offers us an excellent example of a one-piece flower. We see—Fig. 41—its salver-shaped limb, as the broad expanded part is named, surrounding the throat of the tube—Fig. 41, 2—which passes down into the calyx. You may remark, however, that although the primrose corolla is all in one piece, it is evidently marked off by partial division into five segments or petals, just as we found to be the case in the calyx. Very numerous do we find the forms of our one-piece, or monopetalous, corolla: some, like the primrose just alluded to, are what are called salver-shaped; others have the bell shape of the campanula—Fig. 42—or are *rotate* (wheel-shaped) like the blossoms of the well-known forget-me-not—Fig. 43—or, like the yellow florets in the centre of the daisy—Fig. 44 B—are tubular. The daisy, belonging to the class of compound flowers,



41. The corolla of the common Primrose in one piece, or rather of five petals joined in one, constituting a monopetalous corolla —2, the pistil appearing at the throat of the tube of the corolla.

offers in the same head of collected florets, the regular tubular corollas which make up

"The gold-embossed gem"

of the centre, and the *irregular strap-shaped* corollas

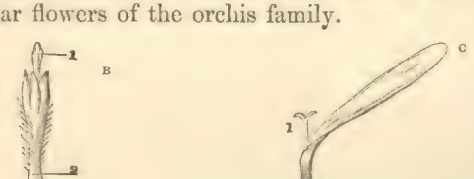
42. Corolla of clustered Bell-flower, composed of one piece, 1— monopetalous — the calyx, 2, also of one piece —monosepalous—deeply divided into five lobes.

43. Sprig of common Forget-me-not, showing rotate or wheel-shaped corollas.

—Fig. 44 c—of the white ray, which surrounds that centre gem with a setting of silver. The forms of irregular corollas, in one piece, or *monopetalous*, are very numerous. Such we find in what are called the labiate or lipped plants, of which the white and red dead nettle—Fig. 45—the mints, the hemp-nettles—Fig. 106, &c.—are familiar examples, and the larger salvias excellent ones.

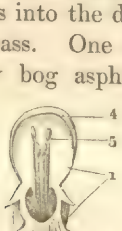
You will find some plants, especially among the parallel-veined or monocotyledonous, in which the blossom is all of one colour; such is the case in the tulip, the wild garlic, the crocus, &c. In these

cases the term *perianth* is applied instead of corolla. This same term also is used in the case of the irregular, very often beautiful, and almost as often singular flowers of the orchis family.

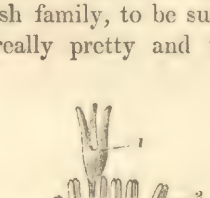


44. Blossoms or florets of common Daisy. B, one of the yellow tubular florets of the central disk—1, its stamens and style—2, the seed. C, one of the white strap-shaped florets of the ray without stamens—1, the style—2, the seed.

Our next step takes us from the region of gay flowers into the domains of the rush, the sedge, and the grass. One of the rush family, to be sure, the yellow bog asphodel, is really pretty and flower-



45. Blossoms of a Labiate plant. 1, the irregular corolla—2, the calyx—3, the lower lip of the corolla—4, its upper lip enclosing the four stamens, 5, of which two are longer than the others.

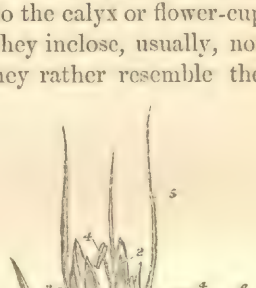


46. Blossoms of hairy Wood-rush —3, the perianth, composed of six glumaceous pieces—2, the stamens, six in number—4, the three-valved capsule surmounted by the triple stigma, 1.

like, and the flowering rush of English pond and river sides bears an umbel of handsome flowers,

albeit it is not a true rush at all; but the rushes generally are, we need scarcely say, sombre and unattractive, until close examination detects the floral formation of their dark-coloured little blossoms, which consist of a single *perianth*—Fig. 46, 3.

In the blossom of the grasses we lose the rayed flower character; and though still we have what answers to calyx and corolla, these bear but little resemblance to the parts as we have hitherto seen them. Take up almost any grass; an ear of wheat will do well, or, indeed, of any grass. You will find that each little spikelet, as in Fig. 47, is composed, in the first place, of two outer scales—1, 1—usually called glumes. These outer scales have been considered to be analogous to the calyx or flower-cup of flowers generally; but as they inclose, usually, not one but several blossoms, they rather resemble the *involucre*, or green outer envelope, of such composite plants as the daisy, the dandelion, &c. Within these outer scales or glumes you will find another set of scales or *paleæ*—Fig. 47, 2, 2—which differ in number according to the species of grass. These inner scales inclose within them the essential flower organs, and may, therefore, be considered to hold the place of the corolla, or of the perianth. The blossom of the grass is sober of hue, and yet how



47. Spikelet of grass—1, the involucre, or glumes, sometimes called the calyx—2, the scales or paleæ of the perianth, sometimes called the corolla—3, the *feathery* stigmas—4, the *versatile* stamens—5, the awns.

well do we find the absence of gay colouring compensated for by the neatness, so to speak, of the compact spikes, or by the elegance of the drooping panicles of many of the grass family, still further adorned by those long awn appendages—Fig. 47, 5—which in the barley or the rye are so conspicuous, and which in the beautiful feather-grass attain the perfection of graceful ornament. Appendages of various kinds are not uncommonly met with attached to the corollas of plants, and fringes of hairs, of glands, &c., as in the buckbean, or in the grass of Parnassus, give additional beauty; as if no "array" could be too bright for the "lilies of the field."

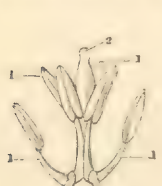
ESSENTIAL ORGANS OF REPRODUCTION.—STAMENS AND PISTILS.

THE STAMEN.

The two parts of the flowering plant which have just engaged our attention, the calyx and the corolla, though generally forming a part, and that seldom the least conspicuous, of the reproductive organs, are not by any means essential to the perfection of these organs, so far as regards the end of their existence—the perpetuation of the species. We now come to organs which *are* necessary for that perpetuation in the flowering plant, without which perfect seed, that is seed capable of being the germ of a new plant, cannot be formed. These essential organs are the stamens and the pistils of flowers. As we found in such a flower as the wallflower an outermost circle of floral development, the calyx, and within that the corolla, the divisions of the one alternating with those of the other; so we find within the corolla, in a perfect flower, the circle of stamens, also in alternate series, these organs encircling the last or central series, the pistil or pistils, which constitute the centre of the flower.

You cannot mistake the stamens in the generality of flower-plants; here we have them in our ever-faithful example, the wallflower—Fig. 48—from which, for the sake of distinctness, the calyx sepals

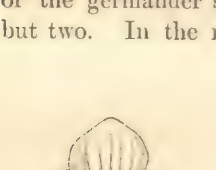
and corolla petals have been removed. These stamens—Fig. 48, 1—are six in number, four long and two short. Open up a buttercup, and we have a whole crowd of these stamens—Fig. 49, 3—too



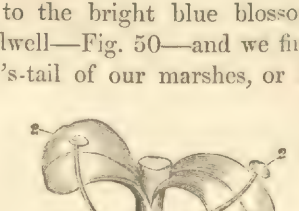
48. Essential re-productive organs of common Wallflower (the calyx and corolla being removed) 1, 1, the stamens—2, the pistil.

49. Section of blossom of common Buttercup—1, petals, of which there are five—2, portion of calyx sepal—3, numerous pistils or carpels—4, numerous stamens.

many to count. Turn to the bright blue blossom of the germander speedwell—Fig. 50—and we find but two. In the mare's-tail of our marshes, or in



50. Monopetalous or one-pieced corolla of common Speedwell, having its two stamens—1—attached to it.



51. Magnified view of simple blossoms of water Star-wort—1, the bracts which constitute the sole floral appendages of the solitary stamens—2, 2.

the water star-wort of our streams—Fig. 51—the number is reduced to one solitary stamen to each

flower, if our readers will permit us to call that a flower which is little more than an insignificant looking scale.

In the examples we have given, you will perceive that the stamen is composed of two parts; that, like many leaves, it has a supporting stalk, called the *filament*—Fig. 52, 1—and an expanded portion called the *anther*—Fig. 52, 2. Moreover, you will generally find the anther marked off into two halves, or *lobes*—Fig. 52. These are the cells or pouches which contain the flower-dust or pollen, and as we have remarked, are generally two to each anther, but not always. As an exceptional example, the water star-wort—Fig. 51—has its anthers but one-celled. The attachment of the filament to the anthers varies, and hence becomes a source of distinction. It may pass up between the lobes, as in Fig. 52, and is then called *adnate;* it may extend only to their base, when it is *innate;* or as in the grasses—Fig. 47—be so attached to some point of the anther as to allow it to swing loosely, when a *versatile* anther is constituted.

52. Stamen of Wood Anemone —2, the *adnate* anther with its two lobes—1, the filament.

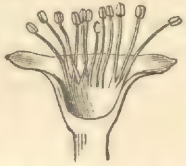
When we discussed the subject of leaves, we found that the length of their supporting footstalks varied greatly. So we find it in the stamen. Refer back to Fig. 29, and you will perceive that in the section of the primrose flower there represented, the stamens—5—situated within the tube of the corolla, are almost destitute of filaments. On the other hand, there are plants whose stamens have filaments

so long that they cannot be packed in the bud without being folded and refolded, as occurs in that familiar plant the ribwort plantain, the little florets of which—Fig. 53—are well worthy of examination.

53. Floret of common ribwort Plantain—1, corolla, within which the long filaments—2—of the stamens are folded when in bud—3.

Refer again to our primrose section—Fig. 29—or better still, go, where you can, and gather primroses or cowslips—either will do—by the hedgerows and in the fields of April, and examine them; you will find the stamens five in number, attached to the corolla. Take the bright blue blossoms of the speedwell—Fig. 50—and examine as many as you may, you will find but two stamens to each, and these also attached to the corolla. Go to the wall-flower, pull off its calyx, and then its petals, as we have done—Fig. 48—but still the stamens, six in number, remain firmly attached just below the seed-pod. In like manner you may serve the buttercup; its stamens also remain after both calyx and corolla have been taken away. Try the same thing with

the potentilla, the strawberry, or the wild rose—also plants of many stamens. The petals come off easily enough and leave the stamens behind them; but when you try to detach the calyx, you bring the stamens with it; for the reason that, as we see in Fig. 54, the stamens are attached to it. As our readers may imagine, these attachments of the stamens to various parts of the flower are to the botanist most valuable distinctive marks. Indeed, in the case we have cited, the different position of the stamens in the ranunculus or buttercup tribe, and in the rose tribe, draws a well-defined line of separation between two most important sections of the vegetable kingdom, the blossoms of which bear a near general resemblance. Neither is the distinction in this case, and indeed in many others, simply one of scientific import; for we find that certain families of plants, distinguished by certain characters of outward form, are also distinguished from one another by their economic uses. To refer to our examples: whilst we find the ranunculus tribe notorious for the acrid and poisonous properties of its members, we draw from the rosaceous plants some of our most delicious and wholesome fruits.



54. Section of calyx of a rosaceous plant, with the numerous stamens fixed upon it.

Mark then, well, when you examine a flower, how its stamens are attached. But you have more to do than this: within certain limits the number of stamens has to be counted. Indeed, if you study the Linnæan mode of classifying plants, this must

be one of your first-sought characters in their examination, for upon the number of stamens the Linnæan classification is principally based. Some plants, like the speedwell—Fig. 50—with its two conspicuous stamens, give us but little trouble: if we take the grasses, we find them, with one exception, in Britain at least, hanging out three *versatile* stamens from each little floret. In the plantain—Fig. 53—in the holly, in the bedstraws, &c., we count four stamens, and in many plants five. But we are anticipating our remarks on plant classification. Let us look for another mark of distinction, and indeed of classification also, in the connexion which in some tribes exists between the stamens themselves. Gather one of the mallows—those things you called "cheeses," in the young days, when anything edible about a plant was its most striking character in your eyes—examine this mallow blossom, and you will find the filaments of the stamens so united as to form a tube through which the pistil passes. Take the pea tribe, you will find the filaments in like manner connected. The tube, however, is either split above, as it is in the gorse—Fig. 55—or, while nine of the stamens seem to form an exclusive brotherhood, one is left solitary. As, however, this solitary member is the uppermost, we may suppose that he constitutes the exclusive, and looks down upon "the mass." Not only, however, are stamens at times united by their filaments, they may be so by their an-

55. Stamens and pistil of common Gorse or Whin, the petals of the corolla being removed. The stamens — 1 — are united by their filaments into a tube through which passes the pistil—2.

thers likewise. If you have never observed this in the violets, look, and you will find it so now; so also is it in the composite flowers, the family of the daisy—Fig. 44—the dandelion, and the marigold. The anthers of the stamens, we remarked above, are generally divided into two cells or pouches, which contain the pollen or flower-dust, that yellow powder which often shakes out so profusely from blossoms in full flushing. Look under the full-blown catkins of the willow in early spring, when—

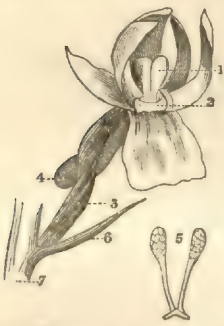
> "Tender leaves on tree and bush,
> Scarce hide the blackbird and the thrush"—

nay, even before the tender leaves appear—and you will find the pollen sprinkling the ground with a golden shower. But, indeed, almost any full-blown blossom furnishes a specimen, and when

> "The breath of May
> Creeps whisperingly where brightest flowers have birth,"

look at the bees after they have been rifling some of these flowers; their well-dusted coats tell of the scenes of their robberies. Abundant, extremely so, is this pollen dust; in some places its quantity must be enormous, for showers of it have been known to fall in localities to which it must have been carried from a distance by the winds. This pollen, this apparently formless dust, is made up of innumerable minute grains, round, oval, or at times triangular, each one of which is instinct with life to fulfil its office. Very minute, however, are these little grains, and you will require a microscope to see them well. The mode in which anthers open to

discharge their pollen varies considerably, some affording it exit by pores, others by valves, &c.; but the most general mode of opening is by what is called the *suture*, or line of opening, which may be traced, by a little examination, in many anthers. An exception to the ordinary form of stamen we find in the family of the orchis. If you take an orchis flower—Fig. 56—to examine for the first time, you will have some difficulty in finding the stamens at all. Our illustration will help you. Mark the point corresponding to that marked 1 in the figure, and there you will find two little pouches, each of which contains a waxy looking stamen, or pollen mass, of the form represented—Fig. 56, 5. If you are a young botanist, and getting enthusiastic, you will be highly delighted with the novelty of poking out, with the aid of a needle, these little organs from their snug concealment. To the careless, these seem trifles; indeed they cannot appreciate the pleasure which the real lover of natural science experiences, as each step leads him on to fresh discoveries of design, ever varied in its beautiful adaptations.

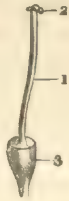


56. Blossom of an Orchis, consisting of a perianth composed of six pieces, the lowest bearing a spur—4. The pouches containing the pollen masses—1. A spot corresponding to the stigma—2. The twisted ovary or seed-vessel—3—supporting the flower with a bract—6—at its attachment to the common flower-stalk—7. The pollen masses magnified—5.

THE PISTIL.

We have now reached the centre of the flower, or rather the important organ, the *pistil*, which occupies the centre, and has for its office the development and maturation of the fruit or seed. As in the stamen we found filament and anther, so in the pistil we find—Figs. 57, 58, 59—1—The

58. Section of blossom of common Crocus, showing long style—1—with three-cleft stigma — 2 — and ovary, or seed-vessel placed far down the tube of the perianth—3.



57. Pistil of Bell flower—the style, 1—the stigma, 2—the ovary, or seed-vessel—3.

59. Section of common Primrose, the corolla removed, showing the parts of the pistil. The style, 1—the stigma, 2—the ovary, or seed-vessel—3.

60. Capsule, or seed-vessel of common Poppy, showing the *rayed* stigma—2—placed close down, or *sessile* upon the ovary—3. The style is absent.

style, crowned by the stigma—2. But besides these two parts, we find a third—3—the ovary, or

seed-vessel; the receptacle of the young seeds, or *ovules*, as they are named before they have been subjected to the fertilizing influence of the pollen. The pistil, then, usually consists of ovary, style, and stigma; usually we say, for the style is not always present. As an example, in the common poppy, the stigma—Fig. 60, 2—is close upon—sessile upon—the top of the seed-vessel. Contrast this with the long thread-like style of the common crocus—Fig. 58—and you will easily comprehend how many variations in the form of this part of the pistil you must meet with in your botanical investigations. Very varied, too, will you find the stigma; at times scarcely to be distinguished from the supporting style, whilst in some plants it is extremely well marked. The campanulas offer us the stigma in three divisions—Fig. 57—and the crocus has likewise a trifid stigma—Fig. 58—but of a different form. In the willow herbs the part is four-cleft, in the primrose it is a little knob, which makes the style and stigma combined bear a resemblance to a common pin. As already adverted to, the stigma, or rather stigmas in the poppy are radiated or star-like; in the grasses and some other plants the organ is often feathery. One special peculiarity of the stigma—only, however, to be discovered by close observation—is the absence of the skin or epidermis, which covers every other part of the plant, its place being supplied by a sticky covering, to which the grains of pollen adhere as they fall from the anther. From these pollen grains, whatever be the length of the style, the fertilizing influence must be transmitted to the ovules, if the

seeds and seed-vessel are to attain maturity, if the former are to possess the capability of continuing the succession of their being. After the pollen of the anther has been ripened and shed upon the stigma, the office of the blossom is over, it withers and dies; or rather we should say, after time has been given for the process of fertilization, the blossom withers. If that process has been perfected, as the flower disappears, the seed-vessel and its contents become more conspicuous as they verge towards the maturity of the perfect fruit: but if no fertilization has taken place, the abortive seed falls with the withering blossom; the hopes of all who till the ground, of the cultivator of the rich fruits of the garden, or of the grains that furnish man with bread, must alike be disappointed, should anything interfere with this most important process of pollen fertilization.

Knowing this, we may cease to wonder at the various provisions made by Creative Wisdom for securing the fulfilment of this all-important effect. These provisions are more especially manifest when, as we frequently find them, the stamens and pistils, instead of being developed in the same blossom, or on the same part of the plant, are separated, or when they are the productions of different plants of the same species. We cannot doubt that the abundant production of the pollen is specially designed to render as free from hazard as possible the fertilization of the seed; and equally certain is it, that the bees, and insects generally, are most active agents in the conveyance of this precious powder to its special destination. It is supposed that the peculiar resemblance which the blossoms of some of the

orchis tribe bear to certain insects, is for the purpose of attracting the insects imitated, and thus of securing their agency in the distribution of the peculiarly placed but very adhesive pollen masses of these flowers. Of plants which have their stamens and pistils developed on different blossoms in the same plant, many of our trees furnish instances. Such we find to be the case with the oak, the hazel, the beech, the alder, the box, &c. But we also find the same arrangement prevailing among such smaller plants as the sedges—Fig. 111—the nettle, the arum, or cuckoo pint—Fig. 82, &c. Of those which bear their stamens and pistils on different individuals of the same species, the willows are the most important; the hop, the yew-tree, the poplar, and others, fall under the same category. Notices of many of these are scattered throughout our wild flowers of the months. Of course, a blossom or a tree, which bears only stamens, produces no fruit—it is barren—hence, by botanists, such blossoms or trees are called the male or barren flower or plant; the pistil, or seed-bearing, being called the female.

We have spoken of the style and stigma, as if always but one simple pistil belonged to each blossom. This, as in the pea tribe and others, is often the case; but in many plants, such as those belonging to the ranunculus tribe, as for instance, in the columbine—Fig. 62—and others, there are a number of distinct pistils, or *carpels*, as they are often called, aggregated in the centre of the blossom, each of course having a distinct style and stigma. In Fig. 61, the withered styles are seen still adhering to the summits of the carpels. In other cases we

find, that instead of the pistils forming separate carpels, as in the case of the columbine or ranunculus, they are combined, fused as it were, into one compound ovary or seed-vessel. In the veronica or speedwell seed-vessel—Fig. 62—we have a com-

61. Seed-vessels, carpels or follicles, of common Columbine; the withered styles—1—still remaining.

62. Seed-vessel—1—two-celled capsule of Speedwell; —the calyx—2—*persistent* —a bract—3.

bination of two pistils to form a two-celled *capsule*, as the fruit is called; in the poppy—Fig. 60—we have a combination of many pistils forming a one-celled seed-vessel. Moreover, as from the rayed stigma or stigmas of the poppy, and also from other marks, we can generally discover indications of the compound origin of ovaries, which, though perhaps apparently simple, are yet made up of many different pistils.

When the ovary or carpel is matured or maturing, it becomes the fruit, in many cases retaining the form and appearance which first characterized it, and showing only increased size. Very often, however, the ripened fruit is vastly different from what

it was when we first made its acquaintance in its baby condition in the blossom. Some parts which when first developed were green and leaf-like, become thick, fleshy, and laden with rich juice, as in the apple, pear, or peach; some assume a covering of impenetrable hardness; whilst others develope all sorts of beautiful contrivances for the dispersion of the seeds. Again, in some plants, where the pistils presented us with two, three, or four incipient fruits, when the blossoms fell, we can find but one at the time of gathering. This occurs in the acorn, the hazel-nut, &c. In such cases, the one seed has usurped the places of the others, gradually attracted the nourishment to itself, and pushed its brethren into obliteration; in other words, strangled them, very much after the fashion in which oriental princes dispense their brotherly favours to those who might claim with them a share of the good things.

That the varieties of fruitage are very numerous we need scarcely remark: these many varieties, however, have been reduced by botanists to the order of a definite classification. The principal features of that classification are lightly, but perhaps sufficiently for our readers, sketched out in the concluding papers of our Monthly Wild Flowers, and to these we refer. To the beginner in botanical science, or to those who wish to acquire no more than such a slight acquaintance with its general principles and features as may enable them to appreciate intelligently the characteristics of plants or of wild flowers, the study of fruits and seeds seldom, at first at least, presents much attraction; and yet we can recommend it to all who would

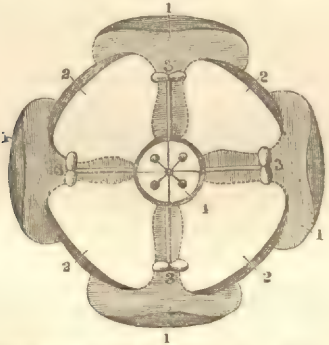
explore one more province in the domains of natural science which lie open before them.

To those who would

> "Trace in Nature's most minute design,
> The signature and stamp of power Divine,".

every fruit, every seed-vessel, every tiny seed that requires the aid of the microscope to exhibit to the eye the beauties of its carved coverings, bears that "signature and stamp."

Let us take a brief review of what we have learned about plant-blossoms. We find that a perfect flower, such as there is in the wallflower, in the ranunculus, in the strawberry, &c., is composed of a series of circles, or as botanists call them, *whorls*—Fig. 63



63. Diagram of a perfect symmetrical flower, showing the various circles or parts alternating with each other. The outer circle or whorl, the calyx—1. The next circle its parts alternating with those of the calyx, the corolla—2—within that the stamens—3—and, occupying the centre of all, the pistil—4.

—one within another to the number of four. Of these, the calyx, either in one piece or in several sepals, forms the outermost circle. Within it, in

one or more pieces—petals—the corolla forms the second circle; within this again are ranged the stamens, and in the centre of all the pistil, which includes the ovary or seed-vessel. Moreover, we find that when a flower is regular in its formation, its various divisions ought to alternate with each other, as shown in the diagram. But we find that all flowers are not perfect in the above sense, and that some of the four circles are either deficient in their usual development, or are entirely absent. Either the calyx or corolla, in their usual forms, are not to be found, or stamens only and no pistil are present, constituting a male or barren flower; or we have pistils and no stamens, forming fertile or female flowers; these *unisexual* blossoms being either the production of the same individual plant, or of separate individuals of the same species. Lastly, we have found flowers in their simplest forms—Fig. 51—and consisting of little more than the single essential stamen, or single pistil, inclosed by an insignificant-looking scale. All these things should you mark in your study of and in your wanderings among the wild flowers: much true botanical science may be possessed without the knowledge of many and difficult names, if it be cultivated by the practical observation and appreciation of plant characteristics as they meet the eye in the fields. "Nature never did betray the heart that loved her:" then try and love her. If the heart has been wounded, and the mind harassed, in the needful strivings of every-day life, in the toil and turmoil of the city;

> "Go forth into the country,
> From a world of care and guile,"

seeking rest, without *ennui;* be assured that you will best find that rest which is most beneficial—the rest of gentle, pleasurable excitement—if you take with you on your country tour, an interest which will tempt you to wander in search of plants. The man who has a keen perception of the beautiful has of course much of fresh interest when he exchanges the scenes of the town for the country, or even the scenery of one district for that of another; but he who also delights in plants, who takes an interest in marking the varied vegetation of different tracts of country, has his pleasure doubled; he is less likely to be overcome with weariness. His botanical pursuits keep him always on the *qui vive;* on bank and brae,—

> "Up the airy mountain,
> Down the rushy glen,"

his eye is ever wandering in search of some new plant. There, upon that rock, he spies a blood-red blossom, and is almost sure it is the bloody cranesbill (*Geranium sanguineum*); at all events he will make sure, and up he goes, exhilarated by the interest of a good climb for his prize, whilst his non-botanical companion remains quiet below. Our botanical friend is the gainer any way. Whether he is right as to the plant or not, he, at all events, gets the exciting exercise; mayhap he not only finds the plant he sought for among the rocks, but some other equally good or better. Scarcely has he descended, when—down in the hollow, far beneath the mountain path, his botanical eye catches the gleam of some milk-white blossoms scattered star-like over the dark green moss. Off he is in a

moment, leaving his companion in amused wonderment as to what new "weed" his friend is by this time so busy gathering. Our botanist had been expatiating to his companion all morning upon the beauty of the grass of Parnassus (*Parnassia palustris*) of our hills, and now he returns with his hands full of the blossoms, ready, as soon as he regains breath, to point out its perfections, not forgetting to remark upon the apparently instinctive movements of its stamens as they fulfil their office of fertilization. We will not follow our botanist on his walk, his ups and downs, his jump over the hedge for a specimen of the brilliant hemp-nettle, or his plunge up to the knees in water to pluck the flowering rush or the arrow-head: but we will ask our reader whether a walk, thus enlivened with ever-recurring sources of interest, is not a pleasant one. It is a regular sporting tour, full of excitement, and its game,—

"Each plant or flower the mountain's child."

FLOWER-BUDS AND FLORAL METAMORPHOSIS.

"There's not a blossom fondled by the breeze,
There's not a fruit that beautifies the trees,
There's not a particle in sea or air,
But nature owns thy *plastic* influence there."
R. MONTGOMERY.

WE have already remarked that in the leaf-bud the contents are always arranged in a certain definite manner in different plants: a parallel arrangement, known to botanists as the æstivation, do we find in the flower-bud. The calyx varies in its bud arrangements, but the corolla still more so. In some plants, as the wood-sorrel, the gentians, or the mallow, it is spirally twisted; in others, as the convolvulus, it is plaited; in the campanula it is valve-like, in the geraniums overlapping, in the poppy crumpled. These things we doubt not many of our readers must have marked for themselves, and will doubtless mark still more attentively, now that their attention has been directed towards them; but, to most, probably, the subject which gives the second heading to this short chapter is new, and they are ready to ask what is meant by floral metamorphosis.

Did you ever, reader, gather a polyanthus or primrose, with, as it were, one flower growing out of another, or with the calyx showing a tendency to imitate the form of the ordinary leaves of the plant? Or did you ever see and wonder at a full-blown rose,

having an ill-formed bud growing out of its centre? Or did you ever examine a rose blossom or a tulip becoming double, or the flower of the beautiful white water-lily, and find some of the stamens, as it were, half petal and half stamen? If you have observed any of these, you will more readily understand the nature of floral metamorphosis, and admit the idea that every part of the flower is but a modification of the ordinary leaf; or, in other words, that every blossom is but a bunch, or more properly a series, of transformed leaves arranged in a certain regular order. This may seem to some persons, at first, a very far-fetched and gratuitous doctrine; but, nevertheless, it is one, the truth of which is well borne out by the observations of botanists in the case of plant structure generally, but especially so by the occasional monstrosities, as they are called, which show attempts to return the flower partly or entirely to the form of the original leaf. The annexed figures, which represent on an enlarged scale some florets of a head of common Dutch clover—which is peculiarly liable to this form of monstrosity—afford an instance sufficiently illustrative of the fact. At Fig. 64, 1, we see the legume or pod alone, imperfectly formed, and partaking of the leaf character, which is completely assumed in the floret—Fig. 65. In Fig. 66 the trefoil character is more completely displayed, the centre leaflet bearing on its margins two or three minute leaflets—2—which evidently correspond to seeds. At Fig. 67 we have again the imperfectly developed pod, and some of the calyx segments tending to assume the trefoil. Fig 68 shows the imperfect pod

of Fig. 67 laid open to display the seeds. Thus we find that calyx, corolla, stamens, and pistils, are all but modifications of the simple leaf, and that even

64. Floret of common Dutch clover, showing legume or pod — 1 — but half formed (magnified).

65. Floret of Dutch clover, showing a leaflet — 1 — occupying the place of the pod.

66. Floret of Dutch clover, showing trefoil leaf—1—occupying the place of the pod; the centre leaflet bearing on its margins two or three minute leaflets—2—evidently corresponding to seeds.

the seeds themselves may be regarded in a similar light—Fig. 66, 2,—the carpel or seed-vessel of the pistil being simply a folded leaf joined at the margins, and bearing at these margins the seed.

67. Floret of Dutch clover, showing half-developed pod — 1 — part of the flower developed — 2 — and the calyx — 3 — tending to become leaf-like.

68. The half-developed pod of Fig. 67 laid open to show seeds.

The subject of floral metamorphosis we have just lightly touched upon is full of interest for its own sake; worthier still is it of attention as a beautiful exemplification of the simple principles which form the foundations of His works from whom both works and principles alike derive their origin.

ARRANGEMENT OF BLOSSOMS.

INFLORESCENCE.

HAVING examined the various parts of the plant and of the blossom, our readers might imagine that with this our remarks on descriptive botany should cease; but there yet remains for us that most important subject, the form of flower development, and the arrangement, so to speak, of the blossoms upon the plant; the *inflorescence*, as botanists designate it. Many different circumstances are there, as we have already seen, contributing to give that charming and never-ending variety which extends over the whole of the vegetable creation, but none perhaps adds more largely to that variety than the differences in the modes of inflorescence.

Most blossoms, or collections of blossoms, are supported upon a primary stalk or flower-stem, named the *peduncle*—Figs. 69, 71, &c. In some cases, the flower or flowers are directly borne by the peduncle, but very frequently this main stem gives off other little stems, as in the currant, cowslip, &c.—Figs. 69, 71, 72, &c., and then these little stems are named the *pedicels*. Many plants, like the primrose, the dandelion, &c., send the flower-stalk, as it were, direct from the ground; it is a simple stem, bearing the flower alone, but neither leaf nor branch, and is then further distinguished as the *scape*—Fig. 69.

When a peduncle or flower-stalk bears but one blossom, the latter is said to be solitary, as it is in the poppy, in flowers borne on scapes, like the dandelion, and in many others. A solitary flower, however, is

69. Common Cowslip—the peduncle, in this case called a scape—1—bearing the blossoms in the form of an umbel—2—on short pedicels—4. The leaves are *crenate*, and are *revolute* or folded back—3—previous to full expansion.

not necessarily a *terminal* one, does not necessarily terminate the peduncle: such flowers as those of the wood loosestrife—Fig. 70—are solitary, but they are also *axillary*, being developed from the axil of the floral leaves. When, as in the currant—Fig. 71—or in the speedwell—Fig. 72—there are many blossoms borne on short pedicels, a *raceme* is formed. When, however, these pedicels are of unequal length, those near the extremity of the peduncle being short,

whilst those further from the extremity increase in length as they descend the stem, so as to bring all the blossoms nearly to a level, what is called a *corymb* is produced, as we have it in the beam tree —Fig. 73.

70. Sprig of lesser Loosestrife, showing solitary axillary flowers; the pedicels—1—springing from the axils of the floral leaves, or bracts—2. The leaves are ovate acute—the segments of the *five-partite* calyx—3—are *subulate* or awl-shaped.

71. Branch of common red currant —(*Ribes rubrum*)—showing the blossoms arranged in *racemes*, which are pendent. The pedicels—1—have each a small bract—2—where they spring from the peduncle—3.

The corymb form of inflorescence must not be confounded with another, which it somewhat resembles, in which the flowers are brought up to a level as they are represented in Figs. 74, 69. This kind of flower arrangement is the *umbel*, one of the most important and characteristic among plants. Now, compare it with the corymb; mark that, while the little pedicels of the latter spring from various points of the main stem, the pedicels of the umbel all take their origin from the same point: a distinction sufficiently plain to be at once recognised and remembered. The umbel form of inflorescence is universal in one family of plants, which derive

their name from the fact, and are called the Umbelliferæ, having at the same time other characteristics peculiar to themselves. Other plants, such as the cowslip—Fig. 69—also bear their flowers in umbels,

72. Sprig of common Germander Speedwell (*Veronica chamædrys*), showing the blossoms arranged in a raceme which is erect. The pedicels—1—have each a small bract—2—where they spring from the peduncle—3. The corolla—4—rotate and four-cleft.

73. Twig of white Beam tree (*Pyrus aria*), showing the blossoms arranged in a compound corymb. The leaves are deeply serrated, or saw-toothed.

but, not possessing the other characters of true umbelliferæ, do not, of course, belong to the order. At times it occurs that, when the first blossoms of a plant are developed, the inflorescence is in the form of a corymb; but as these first-opened flowers are on the outside of the inflorescence, and as the centre blossoms continue to be carried forward by the growth of their pedicels as they expand, it comes to pass that the inflorescence, which began as a corymb, ends in the form of a raceme, as shown—Fig. 75—in the case

of the common shepherd's purse. These three well-marked forms of inflorescence, the raceme, the corymb, and the umbel, are, as our readers will find if they examine for themselves, all liable to become compound by the branching and re-branching of the pedicels or flower-stems. Look at the umbels of the parsley, or of the hemlock, or at the corymb of the beam-tree—Fig. 73—and you will see the fact. In the grasses the raceme form of inflorescence is commonly found very compound—that is, much branched—and then the name of *panicle*—Fig. 76—is given to it.

74. Blossoms arranged in a compound umbel.

75. Sprig of common Shepherd's purse, showing the conversion of a corymb into a raceme by the continued growth of the flowering stem.

Among the grasses we find another form of inflorescence well marked. Gather an ear of wheat, of barley, or of the common darnel grass; observe, the little heads or *spikelets* grow close to the peduncle, or *rachis*, as it is called in the grasses; they form what is very appropriately called a *spike*. The spike is not, however, peculiar to the grasses; we find it in the common plantain, in the meadow orchis, &c. Indeed, the *catkin* inflorescence—Fig. 77—of the hazel, or of the poplar, may be considered a spike modified by the formation and

position of the scales or *bracts* which take the place of calyx and corolla. Now, imagine a spike pressed from above downwards, so as to bring its blos-

76. Stem of the common Hair grass (*Aira*), showing the blossoms arranged in a branched panicle.

77. Branch of Hazel (*Corylus avellana*), showing pendent *spike*—1—in this case called a catkin.

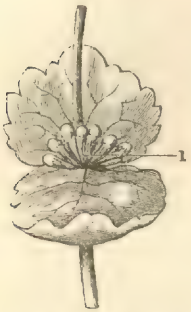
soms all to a level, the top blossom occupying the centre, and the lowest blossoms the circumference, and we have the *head* or *capitulum* of the dandelion, daisy, marigold, leopard's bane—Figs. 78, 101—and others. As the umbel gives the name to one family of plants, so does this head form of inflorescence furnish a designation to one not less important, the compositæ or composites.

Gather one of the flowering stems of the white or red dead nettle—Fig. 79—the flowers are gathered in clusters around the stem, they are what is called *whorled*. The term whorl, however, is applied to leaves as well as to flowers.

78. Composite blossom of Leopard's Bane (*Doronicum Plantagineum*). The peduncle —2—supports a capitulum or head—1—which is made up of a number of separate blossoms or florets; those in the centre—3—constituting the disk. The florets of the ray—4—are *ligulate*, or strap-shaped.

In our examination of various plants, our readers must have observed in how many cases the flower-stems—peduncles—or the pedicels, have, at the points where they branch off from the main stem, and elsewhere, leaves, either resembling the other leaves of the plant, or differing from them in various ways, becoming less and less leaf-like, till they are at length little more than scales, such as we see in the currant — Fig. 71 — or speedwell — Fig. 72. These, corresponding to the *stipules* of leaves, are called floral leaves or *bracts*. As we see in the dead nettle—Fig. 79—or the lesser loosestrife—Fig. 70—the floral leaves and the ordinary leaves of the plant do not exhibit any difference. In the lime tree—Fig. 80—the conspicuous bract is very different from the leaf. In the currant, the bracts, as above observed, are simply scales. A few plants, as some species of salvia, have the bracts gaily coloured. In some cases the bracts are additionally distinguished according to their form, &c. Thus, the bracts which surround the umbels of many umbelliferous plants are called the involucres—

Fig. 98, &c.—so are those named which inclose the flower-head or capitulum of such a plant as the daisy—Fig. 81. The singular hood-like appendage of the curious wake-robin—Fig. 82—is a bract,



79. Blossoms of one of the Dead Nettles arranged in a whorl—1. The floral leaves are amplexicaul, or embracing the stem.

80. Flowering sprig of common Lime tree (*Tilia Europæa*), showing the large lance-shaped bract—1—partially adhering to the peduncle.

and gets the name of a spathe. In the carex tribe, the leaf-like appendages to the spikes—Fig. 83—are also bracts; in the grasses the outer scales or glumes of the spikelets—Fig. 84—are bracts; in the hazel and willow the scales of the catkin are also called bracts.

With the bracts terminates our description of the parts and characters of plants, or rather of such parts and characters as lie upon the surface, and most readily meet the eye of the

81. Blossom of common Daisy (*Bellis perennis*), showing the common involucre—1—of the flower-head or *capitulum*.

observer. Almost superfluous must the remark be, that in our descriptions we have but skimmed the surface of our subject, we have but given such kind and amount of information as seemed best

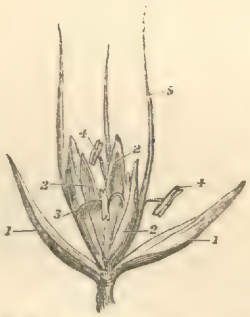
82. Blossom of Wake-robin or Cuckoo-pint (*Arum maculatum*), showing the large bract—1—in this case called a spathe, which surrounds the reproductive organs, the stamens—2—the pistils—3.

83. Sedge, or carex, showing the leaf-like bracts—3—which are situated at the base of the flower-spikes; the fertile, or pistil, or seed-bearing spikes—2—the barren or stamen-bearing spike—1.

calculated to afford a good general idea of the characters which distinguish the native wild flowers of our own land, and of the principles on which botanical distinctions are based.

Our next step must be to point out how the vegetable kingdom is mapped out by means of those

plant characters which have just engaged our attention: how it is divided and subdivided, and its great leading *classes* marked off; how these again are resolved into *tribes*, *families*, and *genera*, so that the skilled botanist finding a plant he had never seen before, may, provided the plant has been enrolled with its brethren, as it were track it down, fix it in class, in tribe, in family, till he finds it amid its own kindred, associated with the other members of its own genus, and finally pounces upon it by the special mark of the individual.



84. Spikelets of grass, showing the outer bracts or involucres—1—called glumes in the grasses, which inclose the florets, these florets being made up of scales or *palæ*—2—inclosing the pistils—3—and stamens—4. In the figure the outer scales of the floret bear awns —5.

THE ARRANGEMENT OR CLASSIFICATION OF PLANTS.

"Happy who walks with Him! Whom what he finds
* * * * * *
In nature, from the broad majestic oak
To the green blade that twinkles in the sun,
Prompts with remembrance of a present God."
COWPER.

WHEN we reflect that somewhere about eighty thousand different kinds or species of flowering plants are now known to botanists, and that, in addition to this large number, there exists an immense variety of vegetable productions which bear no flowers, we may well believe how hopeless would be the task of acquiring any definite or useful knowledge of the vegetable kingdom as a whole, unless its various component parts were reduced to some kind of arrangement or classification. Indeed, when not above a tenth part of the plants now known had been discovered, the necessity for some order amongst them was manifest, and the natural affinities which so obviously gather certain plants into tolerably well-defined groups began to engage the attention of the first cultivators of the science of botany.

Certain families of plants, such as the umbel-bearers or hemlock-like tribes—Fig. 98—the labiates or mint-like tribe—Fig. 106—the grasses—Fig. 113—present so strong a family resemblance one to the

other, that they naturally, as it were, group themselves. But as very many plants, even though closely allied, are not so obviously linked together, the attempts at arrangement were found to be attended with great difficulty and confusion; so that it has only been of late years that the Vegetable Kingdom has been mapped out into anything like order, after the laboured and long-continued exertions of the most illustrious botanists.

Before botany was cultivated scientifically, the first attempts at classification arranged plants as trees, herbs, and shrubs, further dividing them according to their medicinal or economical, their poisonous or harmless properties. As the limits of the subject extended, such vague arrangements were of course found useless, and many attempts were made to introduce some more serviceable method. It would be unprofitable here to enumerate all the plans of classification which have been propounded. The first, perhaps, of any account, was that of Tournefort, founded upon the form of the corolla; but this, even in the early stage of the science, was found impracticable in application. Nothing, in short, was effected, until the celebrated Linnæus appeared upon the stage, and brought forward his beautiful though artificial system, which, from the middle of the last century, until the last fifteen or twenty years, was principally used by botanists. Being an artificial system, however, it has necessarily been superseded by that extended knowledge of science which has enabled botanists to construct the natural system of the vegetable kingdom according to the natural affinities of plants. Linnæus

himself was well aware of the superiority of a natural classification over an artificial one, and left behind him the plan of such a system; but he saw, probably, that the state of botany, as it was in his day, would not admit of the better method being advantageously carried out: he therefore gave us an artificial system, which has never been rivalled. He reduced the immense chaos of botanical knowledge to something like order, and placed it in a condition to be modelled into better shape, as extended knowledge required different, and gave opportunity for more scientific arrangement. In one respect, the Linnæan artificial classification is attractive to a beginner—it is the easiest at first. By it a learner may perhaps very readily find out the (Linnæan) class and order, and the name of a plant; but when he has done this, he has acquired comparatively little real knowledge. By the study of the natural system, on the other hand, much true knowledge is gained when the place of any particular plant in the system has been ascertained: for that place is not a mere arbitrary one assigned by man; it is, we may say, the position fixed for it by the Creator in the system of nature, and that in which it is, at it were, surrounded by its family connexions, by other plants having with it many characters, and perhaps qualities, in common. Moreover, when the first few steps in the study of the natural system have been overcome, the subsequent ones are rendered all the more easy by the knowledge which has been already acquired. This is by no means the case in the classification of Linnæus; we would, therefore, whilst counselling our readers not to neglect the

latter, to devote themselves principally to the acquisition of a knowledge of the natural arrangement of vegetables—to get a general outline of the great principles and leading divisions which mark out the symmetrical whole of this most important section of material creation. Of these principles and divisions we shall endeavour to give a general idea; but, previously, must devote a short space to the consideration of the Linnæan system of classification.

Linnæus founded his system upon characters afforded by the essential reproductive organs of plants, the stamens and the pistils; forming twenty-three classes of plants which have flowers, or at least stamens and pistils; and a twenty-fourth class, the Cryptogamia, including plants, such as the ferns, which are destitute of floral organs. The first eleven classes of the Linnæan system depend simply upon the number of the stamens; the twelfth and thirteenth partly on the number of the stamens, and partly on their relative position to other parts of the flower. The fourteenth and fifteenth classes are regulated by the relative lengths of the staminal organs; the sixteenth, seventeenth, and eighteenth, by the connexion of their filaments; the nineteenth by that of their anthers; and the twentieth by the relative position of the stamen and pistil. The next three classes depend upon the separation of the stamens and pistils in separate blossoms, or on different plants; the twenty-fourth, as stated above, on the absence of these organs altogether. The above classes are subdivided into orders, in accordance with characters chiefly derived from the pistils. But, probably, the reader will

obtain the clearest idea of the system at large, and of its divisions, from an inspection of the annexed synopsis, which is taken from the "British Flora" of Sir William Hooker and Dr. Arnott,* a work formerly arranged according to the system in question, but now adapted to the natural classification.

* Those who desire seriously to acquire a good knowledge of our British plants will find this well-known work their best assistant.

CLASSES AND ORDERS

OF

THE LINNÆAN SYSTEM OF BOTANY.

Class

1. Monandria . . 1 stamen in each flower.
2. Diandria . . 2 „ „
3. Triandria . . 3 „ „
4. Tetrandria . . 4 „ „
5. Pentandria . . 5 „ „
6. Hexandria . . 6 „ „
7. Heptandria . . 7 „ „
8. Octandria . . 8 „ „
9. Enneandria . . 9 „ „
10. Decandria . . 10 „ „
11. Dodecandria . 12 to 19 in each flower.
12. Icosandria . . 20 or more stamens inserted on the calyx.
13. Polyandria . . 20 or more stamens inserted on the receptacle.
14. Didynamia . . 4 stamens — 2 long and 2 short.
15. Tetradynamia . 6 stamens — 4 long and 2 short.
16. Monadelphia . Stamen filaments united into one set.
17. Diadelphia . . Stamen filaments united into two sets.

18. Polyadelphia . Stamen filaments united into three or more sets.
19. Syngenesia . . Stamen anthers united—flowers compound.
20. Gynandria . . Stamens inserted on the pistil.
21. Monœcia . . Stamens and pistils on separate flowers on the same plant.
22. Diœcia . . . Stamens and pistils on separate flowers or different plants.
23. Polygamia . . Stamens and pistils separate in some flowers, united in others, either on the same plant, or on two or three distinct ones.
24. Cryptogamia . . Destitute of true flowering organs.

THE ORDERS.

The orders in the first thirteen classes are founded on the number of styles in each flower:—Monogynia, 1 *style*; Digynia, 2; Trigynia, 3; Tetragynia, 4; Pentagynia, 5; Hexagynia, 6; Heptagynia, 7; Octagynia, 8; Decagynia, 10; Polygynia, many styles.

The orders of the 14th class are two:—

1. Gymnospermia....Seeds 4, apparently naked.
2. Angiospermia ....Seeds contained in a distinct seed-vessel.

The orders of the 15th class are two:—

1. Siliculosa....Seeds in a short pod or pouch.
2. Siliquosa ....Seeds in a long pod.

The orders 16, 17, 18, are founded upon the number of the stamens in each set—Triandria—Pentandria, &c.

The orders of the 19th class are three, and are founded on the structure of the flower, which is compound:—

1. Æqualis .... All the flowers perfect.
2. Superflua.... Florets of the disk perfect, of the ray with pistil only.
3. Frustranea Florets of the disk perfect, of the ray with neither stamen nor pistil.

The orders of the 20th class are founded on the number of the stamens, Monandria, Diandria, &c.

The orders of the 21st and 22nd classes are founded on the number, union, and situation of the stamens, Diandria, Monadelphia, &c.

The orders of the 23rd class are three: Perfect flowers. Fertile—pistil-bearing flowers. Barren—stamen-bearing flowers. On one plant, Monœcia—on two different plants, Diœcia—on three different plants, Trioecia.

The orders of the 24th class are founded on natural orders—ferns, mosses, &c.

PART II.

CLASSIFICATION OF PLANTS

ACCORDING TO THEIR NATURAL ORDERS.

Although we may assume that there is actually but one *perfect* natural arrangement of the vegetable kingdom, we may also, perhaps, assume that the recognition of its perfection can never come within compass of the human mind. A perfect arrangement must be devoid of classification altogether; it can have no divisions, it must be the perfect whole, compacted of diverse parts: it can thus be viewed only by the Maker of all things. That man may be enabled with his finite intelligence to grasp the subject, he must introduce divisions, classifications, something of his own mind; and as men's minds vary, and each looks at things in its own way, we cannot wonder if classifications, even when founded upon the natural arrangement, but propounded by different authorities, have differed considerably in detail, although agreeing in general principles. The arrangement of Dr. Lindley, in his great work, "The Vegetable Kingdom," might well have been our guide here; but the somewhat different system adopted in the "British Flora" of Hooker and Arnott is, perhaps, more in accordance with the plan of our short exposition.

Under the natural arrangement, the vegetable kingdom is first divided into *three great classes;* the first, Dicotyledonous or Exogenous plants—the second, Monocotyledonous or Endogenous plants—the third, Acotyledonous plants. The plants of the first and second classes bear flowers, those of the third do not.

The plants of the first class are most generally found in the temperate zones, those of the second and third in warm climates.

DICOTYLEDONOUS OR EXOGENOUS PLANTS.

The character of a dicotyledon most easily recognisable is the branched or reticulated veining of the leaf, and next to that the formation of the stem, which consists of central pith, of wood, and bark, and increases in size, by means of a layer of new substance being every year deposited between the two latter. This mode of growth gives a section of the stem of an *exogenous* plant a ringed appearance, as any one may see who examines a newly-cut tree; the number of the rings corresponding to the number of the years of growth. These rings, moreover, are crossed at intervals by straight lines—the medullary rays—which diverge from the central pith and connect it with the bark, serving, in all probability, as channels for the conveyance of the proper, that is the elaborated juices of the plant, into its central parts. To the above characters is added that derived from the seed, which, possessing two seed-lobes, or cotyledons, gives the name di-cotyledon. The two-lobed character is very conspicuous in such large seeds as those of the bean,

lupin, &c., but in many minute seeds it is ascertainable only by careful examination. This, however, is of comparatively little import to the general observer, as the veining of the leaf and the formation of the stem are in most cases obvious, and for him at least sufficiently trustworthy guides.

In the system we have adopted as our guide here, the dicotyledonous plants are subdivided into four main sections. The fourth section is characterized by the presence of only one floral envelope, which is called neither calyx nor corolla, but perianth. The first three sections derive their characters partly from the position of the stamens, and partly from the divisions of the corolla. The sections themselves are again divided into lesser sections, so as to facilitate the arrangement of the natural families or orders which comprise the genera* and species. By a species is meant an individual plant, or kind of plant, which possessing certain definite and sufficiently well-marked characters *peculiar to itself*, transmits these characters unaltered to succeeding generations of plants which spring from it. Thus, if we take a seed of the common wallflower, and sow it, we expect, and with certainty, that a plant will spring up similar to that from which the seed was gathered—similar, but we cannot say in every point exactly the same. There may be a different shade in the colouring of the flowers, or other minor differences; but these are not sufficient to constitute a difference in species—they are too inconstant.

By a genus is meant a collection of such species or kinds of plants, each possessing certain marked

* Latin plural of genus.

84. *Ranunculus auricomus*, or Wood Crowfoot, an example of the natural order *Ranunculaceæ*. The five petals of the blossom, 1—the numerous stamens, 2—the fruit, 3—consisting of many carpels or achenes, and the divided leaves, are all characteristics of the order. The flower gives an example of the polypetalous corolla, that is of one divided into a number of distinct petals. The veined leaves are distinctive of the great dicotyledonous division of the vegetable kingdom. The radical or root leaves—4—are reniform or kidney-shaped in their general outline, and are a good example of a three-*partite* leaf; the stem leaves—5—being much divided into linear segments.

and permanent individual characters, but all agreeing in certain other general characters which link them together as one race or genus. No better example can we find than the genus Ranunculus, which comprises twenty species, natives of Britain. Fig. 84, the *Ranunculus auricomus*, or wood crowfoot, affords an example of one of the prettiest of the collection —from it and from the following figures we may derive some idea of the general characters of the genus, and perhaps something more. The chief characters of the ranunculus genus are, calyx of five sepals, not prolonged at the base—Fig. 86—petals 5 —Fig. 84—with a nectary at the base—Fig. 85—achenes—Figs. 84, 86—without awns.* All these characters we find in the wood crowfoot; but we also find them in the nineteen other British members of the genus ranunculus; consequently, if we are to distinguish the wood crowfoot as a species,

85. Petal of a Buttercup, showing nectary—1—at its base.

86. Section of blossom of common Buttercup —1, petals, of which there are five—2, portion of calyx sepal—4, numerous pistils or carpels (achenes)—5, numerous stamens.

we must find out some characters which it pos esses distinct from all the rest. Let us see what cha-

* Hair-like prolongations from the apex.

racters it has of its own. Its leaves are divided—this at once distinguishes it from the five ranunculus spear-worts; its flowers are yellow, and the colour (a good distinction in this genus) separates seven species of white-flowered ranunculus. We have now but eight species to distinguish among, but three of these have warted or prickled achenes or seeds, and annual roots, neither of which characters our wood crowfoot possesses. Of the five species we are now reduced to, but two have smooth leaves, the wood crowfoot and the celery-leaved crowfoot; but in the latter, besides other characters, the calyx is smooth, whereas in the wood crowfoot it is covered with down.

87. Stamens of Wood Anemone. 2. The anther, adnate, with its two lobes.

Having now hunted down, as it were, our species, some persons may remark, "We could have told that this was different from any other ranunculus, without all this trouble." Possibly so: many persons can detect the general difference of aspect which distinguishes, in the majority of instances, one plant from another; but none perhaps, without botanical training, could sit down and write a description of a plant which would convey to another individual any accurate idea of the plant,—hence the vague and generally useless descriptions given, by non-botanical travellers, of the vegetation of newly-traversed countries. On the other hand, when a botanist gathers a plant perfectly new to him, a glance tells him to which of the three leading divisions of the vegetable kingdom it belongs; a more

careful examination fixes its family or order, perhaps its genus; a little further, and by reference to published descriptions of plants, he perhaps finds that the species has been already described and named by some prior discoverer; but if not, and if the finder has reason to believe that a plant is perfectly new, and hitherto undescribed, his task must be to detect in the species some marked character or characters, which may distinguish it from every other of the eighty or ninety thousand species already known and described. We may well imagine how, but for the classifications and divisions, this would be an impossibility. Now, perhaps, the reader may understand how from class to order, to section or alliance,* thence to family and genus, a botanist may carry a plant, till at last, as species, he separates the individual.

We have examined the genus Ranunculus as made up of various species; we must now look at it—the whole genus—as but one member of a larger community, the natural order or family of the Ranunculaceæ, which contains, besides the genus Ranunculus, thirteen other genera, natives of Britain. The anemones, the globe-flower, the columbine, the aconites, &c., are all examples of the natural order in question; for, though by no means bearing the same general palpable resemblance that the species of a genus—such as Ranunculus—do to one another, they have certain common points of character, which enable botanists to throw them into a group or family—albeit the eyes of the superficial or non-botanical observer will now afford him but little

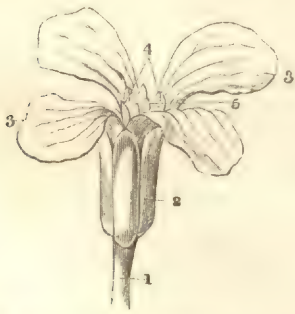
* Dr. Lindley makes certain divisions under the name of alliances.

help; the connecting links lie deeper than mere external resemblances. The Ranunculaceæ are remark-

88. Common Watercress (*Nasturtium officinale*), an example of the natural order Cruciferæ; the blossoms being first developed as corymbs—1—subsequently becoming racemes by the growth of the peduncle. The fruit—a pod or siliqua. The leaves placed alternately on the stem, and with branching veins.

able chiefly for their acrid and poisonous qualities. In the case of some of the aconites and hellebores these are developed in an intense degree; but many even of the common buttercup or crowfoot genus are remarkably acrid. In the Hebrides the lesser spearwort (*Ranunculus flammula*) and the celery-leaved crowfoot (*Ranunculus sceleratus*) are said to be employed as blisters, producing their effects very rapidly, but often too violently. The presence of the plants belonging to this family usually characterise a cold damp climate; and, indeed, the name is derived from the Latin *rana*, which signifies a frog, from the nature of the localities in which the plants principally abound.

But let us take another natural order, the Cruciferæ—Fig. 88—more important by far than the Ranunculaceæ as regards useful products, and containing thirty-three British genera. Like the Ranunculaceæ, the Cruciferous family, which includes such



89. Blossom of common Wallflower, cross-like or cruciform in shape—1, peduncle or flower-stem—2, calyx or flower-cup in four distinct parts or sepals—3, 3, petals, four in number composing the corolla—4, stamens—5, pistil.

90. Essential reproductive organs of common Wallflower (the calyx and corolla being removed). 1, 1, the stamens—2, the pistil.

plants as the wallflower, the cresses, the rockets, the wild mustards, &c., has the corolla divided into separate pieces; but in this instance the prevailing number is four—Fig. 89—and the petals are placed in a cross-like or cruciform arrangement; the calyx sepals also are four. The stamens are, as in the Ranunculaceæ, inserted upon the receptacle at the base of the pistil, but instead of being numerous, are of the definite number of six—Fig. 90—four being long and two short. Cruciferous plants have but one pistil—Fig. 90—which ultimately developes into a seed-pod, or into a pouch—Fig. 88. The leaves are alternate, and the flowers are generally first infloresced in the form of the corymb—Fig. 88—but ultimately develope into racemes. The family of the Crucifers yields us many plants which are so developed and ameliorated by cultivation, as to take place among our most esteemed vegetables; it is sufficient to name the turnip, the cabbage and all its tribe, the sea-kale, &c.; also the various cresses, the radish, the mustards, &c., the water-cress, and the scurvy-grass. The repute of the latter plants as antiscorbutics is popular. The seeds of many cruciferæ, such as rape or mustard, yield oil in large quantities. The geographical distribution of the order is chiefly in the temperate zones; very sparingly indeed in hot climates.

Few if any natural orders are more important than the next we examine—the Leguminosæ or pod-bearers, or pea-tribe; none have their general characters more strikingly marked. The corolla, it is true, is still composed of a number of pieces, as in the case of the ranunculus, or of the cruciform; but

how differently are these pieces arranged!—Fig. 91—not in a circle around the essential reproductive organs, but in the elegant form which we all recognise as peculiar to the pea tribes, and which has so well been named papilionaceous, or butterfly-like.—Moreover, we find both corolla and stamens fixed, not upon the receptacle, but upon the calyx; the filaments of the stamens, which are generally ten

91. Portion of Wood Vetch (*Vicia sylvatica*), an example of the natural order Leguminosæ. The blossoms, composed of five petals—1—are papilionaceous. The fruit—2—is a legume or pod. The leaves are placed alternately on the stem, are compound and furnished with tendrils—3. At their junction with the stem are stipules—4.

in number, being either completely united into a tube—Fig. 93—or nine of them joined into one piece, whilst one, the superior stamen, is left free. The pistil of the leguminous plants is single, constituting, when in fruit, a pod or legume—Fig. 91. The leaves are alternate on the stem; generally

92. Winged stem of Vetch.

93. Stamens and pistil of common Gorse or Whin, the petals of the corolla being removed. The stamens 1—are united by their filaments into a tube through which passes the pistil—2.

compound; often furnished with tendrils, and have stipules at the base. "The leguminous order is not only one of the most extensive known, but is also one of the most important to man, whether we consider the beauty of the numerous species, which are among the gayest coloured and most graceful plants of every region, or their applicability to a thousand useful purposes. The acacia is not less valued for its airy foliage and elegant blossoms than for its hard and durable wood. The logwood and rosewoods of commerce; the laburnum; the furze and

the broom, both the pride of the otherwise dreary heaths of Europe; the bean, the pea, the vetch, the clover, the trefoil, the lucerne, all staple articles of culture by the farmer,—are so many leguminous species. The gums arabic and tragacanth, the senna, and various other drugs, not to mention indigo, the most useful of all dyes, are products of other species."* Many species of Leguminosæ, however, are poisonous; such is the case with the common laburnum.

In some respects our fourth natural order, the Rosaceæ or rose tribes, appear to resemble the Ranunculaceæ. The divisions, both of calyx and corolla, are mostly the same; the stamens are numerous, but their attachment to the calyx—Fig. 96—instead of to the receptacle, is a perfect distinction. In the rose tribes the carpels or seeds are numerous, but differ considerably in their arrangement. In the rose itself they are contained in a cup or ovary—which is partly composed of the calyx; in the strawberry, on the other hand, a true rosaceæ, the carpels are borne on the receptacle—Figs. 94, 97—which, when enlarged, becomes what we call the fruit. The leaves of the rose tribe plants are alternate, and, like the pod-bearers, have stipules at the base of the leaf-stalk.

Almost is it unnecessary to refer to the floral beauty of many of the rose tribe. The strawberry and raspberry likewise belong to it; also the apple, the pear, the peach, and many others. The latter, however, are scarcely considered to belong to the true roses, and are ranked in a sub-order. Many

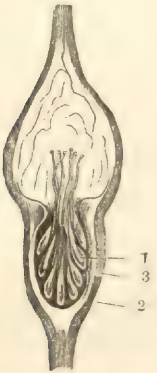
* Lindley's Vegetable Kingdom.

of the last-named plants yield prussic acid largely from the leaves, flowers, or kernels of the fruit; whereas the prevailing principle of the true Rosaceæ is astringency.

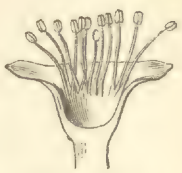
Another tribe, the Umbelliferæ, or umbel-bearers

94. Common Wild Strawberry (*Fragaria vesca*), an example of the natural order Rosaceæ. The calyx—1—in this instance ten-cleft. The corolla consisting of five petals—2. The stamens numerous. The seed or carpels borne on a fleshy *receptacle*—3.

—Fig. 98—have we with five petals to the corolla, but in all respects very different from those tribes which have already engaged our attention. These plants derive their name from the arrangement of



95. Section of Rosebud, showing the calyx—2—adhering to and forming part of the ovary and seed-cup—3.



96. Section of calyx of a rosaceous plant, with the numerous stamens fixed upon it.

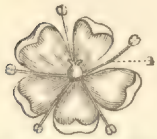
their blossoms in the form of the umbel; but at the same time, other characters besides this are essential to constitute them true members of the order. The seed, or rather fruit—Fig. 100—is peculiarly characteristic. It consists of two carpels, or achenes, combined, and attached near the apex to a central axis, from which they usually separate when ripe. Thus each separate little "caraway seed" is one of these carpels;

97. Section of a Strawberry blossom; the receptacle—1—which enlarges and becomes the fruit.

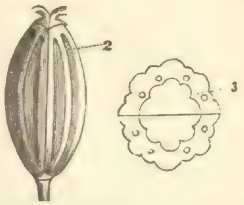
albeit it is not truly a seed, but a seed-vessel, for the real seed lies within. The fruit of the um-

98. Rough Chervil (*Cherophyllum temulentum*), an example of the natural order Umbelliferæ. The blossoms are borne on umbels—1—in this instance compound and with partial involucres—2. The leaves are alternate, compound, and sheathe the stem at their base—3.

belliferous plants is usually strongly marked by longitudinal ribs and ridges—Fig. 100—and in the interstices between these, in the substance of the carpel, lie minute channels named vittæ, which contain the peculiar essential oil so commonly met with in these seeds. Each blossom of an umbel-bearing plant contains two styles, which crown the young carpels, and also five stamens, placed alternately with the five petals—Fig. 99. These petals have often what is called an "inflected point" as represented, and are sometimes very



99. Blossom of an umbel-bearing plant, having five petals—1—each with an inflected point—five stamens, and a pistil with two styles.



100. 2, magnified view of the fruit of an umbelliferous plant—3, section of the same fruit, showing vittæ.

unequal in size. The umbels are often compound, and with involucres—Fig. 98. The leaves are compound, often extremely so, and sheathe the stem at the base—Fig. 98.

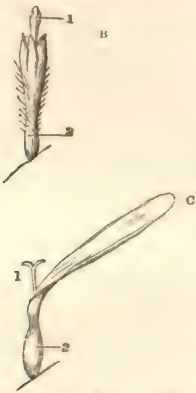
The natural order of the umbel-bearers is a most extensive one, and includes species possessed of very different characteristics. Some, like the hemlock, the dropworts, &c., are virulent poisons; whilst others, such as the well-known caraway, the dill, the anise, &c., afford us some of our most valued aromatics. What are called gum-resins, such as asafœtida, galbanum, &c., are also yielded by this

family; and from it, under the influence of cultivation, we derive the carrot and parsnip, celery, parsley,

101. Michaelmas Daisy (*Aster tripolium*), an example of the natural order *Compositæ*. The florets collected into a head or *capitulum*—1—surrounded by an involucre—2.

&c. The blossoms of umbellifers vary from white —their most general colour in this country—to yellow, as in the pepper saxifrage and parsnip; to pink, as in the hedge-parsley; or to blue, as in the sea-holly.

The Compositæ, or compound-headed plants, constitute an order which yields to none, either in extent or importance. The generality of people are in the habit of confusing the flowers of this family with the double blossoms of cultivated plants; from which, however, they are perfectly distinct. The head of a composite—see Figs. 101—103—is



102. Blossoms or florets of common Daisy. B, one of the yellow tubular florets of the central disk—1, its stamens and style—2, the seed. C, one of the white strap-shaped florets of the ray, without stamens—1, the style—2, the seed.

103. Composite blossom of Leopard's-bane. The capitulum or head—1, florets of the disk—3, *Ligulate* or strap-shaped florets of the ray—4.

made up of a number of small blossoms or florets, many or most of which are complete in themselves, possessing calyx, corolla, stamens, and pistil—Fig. 102. The green covering—Fig. 101—which people so often confound with the flower-cup of other blos-

soms, is no calyx at all, but a general involucre or envelope to the flowers within. The corolla of the composite florets occurs in two forms, either tubular —Fig. 102, B—or ligulate, or strap-shaped—Fig. 102, C. Many plants, such as the daisy, have two forms of the corolla to complete the flower-head. The distribution of the stamens and pistils among these florets is subject to considerable variation. In some cases all are perfect; in others, many of the florets are deficient as regards the essential organs of reproduction. The fruit of the composites, like that of the umbel-bearers, looks like a seed, but is actually a seed-vessel or achene, within which the true seed is contained—Fig. 104. It is generally beaked, and often crowned with a feathery appendage called the pappus—Fig. 104. This is, in fact, the calyx, which surrounded the floret corolla in the stage of blossoming. The stamens of the composites are five, and are united into a tube—Fig. 102, B—through which the style passes, the style itself being bifid or cleft. Moreover, the composite order is the first we have come to with the corolla in one piece—monopetalous. So extensive is the natural order of the composites, that it is conveniently subdivided into tribes. In the first of these, the chicory composites, the florets of the flower-head are all strap-shaped, and in form resemble the white florets of the daisy—Fig. 102. To this tribe belong

104. Seed of Dandelion, with stalked pappus.

the goat's-beards, the sow-thistles, the dandelion, and the lettuces. In the next tribe, which includes the various thistles, the burdock, &c., the florets are all tubular—Fig. 102. In the third tribe there is, in addition to other distinctions, an intermingling of tubular and strap-shaped florets, as we find in the daisy—Fig. 102—or in the leopard's-bane—Fig. 103. Although the composites yield us some vegetables used as food, such as the lettuce and the Jerusalem artichoke—the properties of the plants which constitute the order adapt them for medicinal rather than for nutritive purposes. The lettuce, even when ameliorated by cultivation, is narcotic, and strongly so when growing wild. The well-known chamomile yields a powerful bitter along with its aromatic oil. The dandelion is a valuable remedy in derangements of the liver. Nor must we forget the well-known and powerfully bitter and aromatic wormwoods. Moreover, from the composites we derive some of the gayest ornaments of the garden. First comes the well-known dahlia; then have we the asters, the cinerarias, the chrysanthemums so beloved by the Chinese, and many others. Albeit, some of our native composites are by no means wanting in beauty. The purple goat's-beard, the leopard's-bane, the golden-rod, the corn blue-bottle, are well-favoured plants; the thistles are many of them handsome—so is the familiar burdock, with its large telling foliage. Even the dandelion would be more thought of were it less common; though, common as it is, the daisy is always a "bonny gem" to all true flower-lovers; and well may the composites, even the stateliest, be glad to claim it for their own.

Our next order, the Scrophulariaceæ, or figworts, although it contains such familiar plants as the veronicas or speedwells, the digitalis, the toadflax, &c., is less likely to attract notice by any outward marked family resemblance among its members than the orders which have hitherto engaged us. Indeed, our naming the speedwells and the digitalis in the same order, would illustrate the remark, without adverting to a figwort itself, *Scrophularia aquatica*—Fig. 105—a species of the genus which gives its name from the family. The figworts have the—generally irregular—corolla in one piece—Figs. 50, 72—the calyx in four or five lobes—Fig. 62—and *persistent*, that is, continuing along with the fruit. The stamens are seldom only two in number, as they are in the veronicas—Fig. 50—more generally they are four, two long and two short, or, as it is called botanically, *didynamous*. The style is one with a two-lobed stigma: the fruit is a capsule with two cells—Figs. 105, 72. The leaves are opposite.

The natural orders we have hitherto presented to our readers' notice have all possessed so well-marked a general family resemblance, that they may have been tempted to think this natural classification an easier business than they had been led to believe. The figwort family is only one among a vast number of others, in which it requires the educated botanical eye and mind to detect the deeper-seated links which bind its genera and species together, and it is sufficient illustration to cite the names of such different-*looking* plants as the foxglove, the speedwell the eyebright, or the

toadflax; the yellow rattle, the mullcins, and the

105. Water Figwort (*Scrophularia aquatica*) an example of the natural order Scrophulariaceæ. The corolla—1—of one petal and irregular. The seed—2—a capsule, the leaves opposite.

figworts themselves, adding to them the well-known exotic calceolaria.

106. Large-flowered Hemp-nettle (*Galeopsis versicolor*), an example of the natural order Labiatæ. The corolla—1—in one piece, *monopetalous*, irregular. The calyx—2—tubular. The leaves opposite the stem square.

The Labiatæ, labiates, or lipped plants, form an order extensive as it is well marked; one, moreover, noted for the beauty and fragrance of many of its members. Lavender, thyme, marjoram, the mints, are all labiates; so are the sages and salvias. The large-flowered hemp-nettle (*Galeopsis versicolor*)—Fig. 106—is the handsomest, perhaps, of our British species, and very characteristic. The monopetalous corolla—Figs. 106, 107—is in one piece, and two-lipped; the calyx tubular; the stamens are, as in the fig-worts, two long and two short. The fruit consists of four achenes, which are like four seeds lying at the bottom of the calyx, and, indeed were formerly considered to be *naked seeds*; the leaves are opposite, and the stems square. The characters of labiate plants are too apparent to be easily mistaken, in many cases their very fragrance betrays them, as it arises from the numerous little cells—somewhat like those in the rind of the orange—which are filled with essential oil, and distributed over the plant.

107. Blossom of a labiate plant. 1, the irregular corolla—2, the calyx—3, the lower lip of the corolla—4, its upper lip enclosing the four stamens—5, of which two are longer than the others.

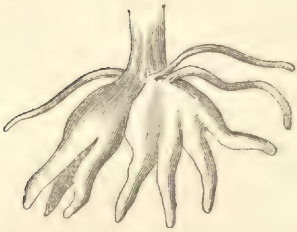
MONOCOTYLEDONS.

At our next step in classification, we leave the net-veined foliage of the dicotyledons for the parallel-veined leaves of the monocotyledons, well represented by the well-known and handsome Orchidaceæ, or orchis family. In the small white butterfly orchis (*Habenaria albida*)—Fig. 108—we have

the straight-veined alternate leaves, the flowers arranged in a spiked raceme, the knobbed root. The orchis blossom, now called perianth, we see in six pieces—Fig. 110—supported by the twisted ovary, and bearing in its centre the combined reproductive organs, the stamens contained in their little cells or pouches. Few, if any, families of plants can boast of as great a variety of beautiful, and, we may add, extraordinary form, as the orchids. Some of our readers may have seen in conservatories the splendid orchis blossoms of tropical climates; few can be ignorant of the "king-cups" of our meadows, the beautiful purple orchis of early summer, and others may have met with the curious bee-orchis or spider-orchis, either in its wild state or cultivated; these last, good examples of the curiosities of form which we find displayed among the members of this interesting family. Some of the orchids—as the habenaria — Fig. 108 — are extremely fragrant. Beauty

108. Small white Butterfly Orchis—(*Habenaria albida*), an example of the natural order Orchidaceæ. The blossoms arranged in a spike; the root having *knobs*, 2.—The leaves with parallel veins.

is the characteristic of the orchis family; their known uses, economical or medicinal, are but small. The tubers of some of the species yield a peculiar nutritive gum, which forms, when properly prepared, a mucilaginous jelly, like arrowroot.



109. Root of the Spotted Orchis, with palmated tubers or knobs.

110. Blossom of an Orchis, the perianth in six pieces, the lowest bearing a spur—4. The pouches containing the pollen masses—1. A spot corresponding to the stigma—2. The twisted ovary—3—supporting the flower and having a bract—6—at its attachment to the stem—7. The pollen masses magnified—5.

Another family of monocotyledons, the Cyperaceæ or sedge order, devoid of gay colouring, differ greatly from the orchids, but, nevertheless, are in their own way sufficiently handsome. Our example —Fig. 111—is by no means the plainest of the family. This tribe of plants, like the grasses, has the essential organs of reproduction, the stamens and pistils, inclosed simply by scales, or, as they are called, glumes. In the sedge tribes, these glumes are imbricated, laid over one another, like the tiles of a house, and are arranged upon or around a

central axis—Fig. 111—forming a spikelet, either of barren, stamen-bearing flowers—Fig. 112—or of

111. Cyperus-like sedge—Carex pseudo-Cyperus—an example of the natural order Cyperaceæ. The flowers collected on spikes, 1—consisting of scales, 2—inclosing the pistil, or—3—inclosing the stamens. The stem triangular, the leaves with parallel veins and sheathing at the base. The bracts—4—long and foliaceous, or leaf-like.

fertile flowers—Fig. 112—or of both on the same spike—Fig. 111. The leaf-like bracts, the triangular stems, and the sheathing leaves are all further characteristic of this distinct order. Whatever useful properties the Cyperaceæ possess are of a mechanical kind: they yield little in the way of medicine

112. Sedge, or carex. The leaf-like bracts—3—situated at the base of the flower-spikes. The fertile, or pistil, or seed-bearing spikes, 2—the barren or stamen-bearing spike, 1.

or of food, either to man or animals; mats, ropes, &c., may be made from some of the species of the family. The ancient Egyptian papyrus, or paper, was the product of one of its members.

In many respects similar to the sedge tribes, but in many different, the Gramineæ, or grasses, are a

family at once most distinct in their characters, most extensive in their number and distribution over the

113. Rushy Sea-wheat Grass (*Triticum Junceum*), an example of the natural order Graminew. The blossoms—1—consisting of scales arranged in spikelets, which are supported by a common axis or rachis—2. The stem round, jointed; the leaves parallel-veined and sheathing at the base.

1 2

earth's surface and most important to man. Like other monocotyledons, the grasses have the straight-veined leaf which sheathes the stem before leaving it —Fig. 113—the stem itself being cylindrical, generally hollow, and interrupted at intervals by knots.

114. Spikelet of Grass. The involucre, sometimes called the calyx, 1—the scales or palese of the perianth, sometimes called the corolla, 2—the *feathery* stigmas, 3—the *versatile* stamens, 4—the awns, 5.

The grass blossoms are arranged upon a central stem or rachis, and consist, generally, of three stamens, with *versatile* anthers, and two styles with feathery stigmas — Fig. 114 — inclosed within the glumes, scales, or, as they are sometimes called, valves, which answer to the floral envelopes of flowers generally. No order or family of plants is more truly natural than that of the grasses, none perhaps is so important and necessary to man's comfort, and even existence. In every latitude are grasses found, from the shores of the Arctic Sea to the tropics, where they often attain the height of trees.

The study of the wild grasses is interesting, but that of "the distribution of cultivated grasses is one of the most interesting of all subjects; it is determined, not merely by climate, but depends on the civilization, industry, and traffic of the people, and often on historical events."

ACOTYLEDONS.

With the Acotyledons we arrive at the third great division of the vegetable kingdom, of which the members do not possess true seeds, do not produce true flowers, and are for the most part destitute of the fibres and vessels which enter into the structure of the higher classes of plants. Among acotyledons, or cellular plants, the ferns, the club-mosses, and the horsetails* hold the highest place, the first, especially, approaching in many respects the flowering plants. The great mass, however, of the cellular division is made up of vegetable productions low in the scale. Such are the lichens, the fungi or mushroom tribes, the sea-weeds, and, lower still, those simplest forms of vegetable life which are little more than simple cells or vesicles.

Vast, indeed, are the domains of the kingdom of vegetables, and varied as vast. The arctic voyager beholds the snow reddened by the presence of a microscopic vegetable cell, which there finds a congenial habitation; scarcely a decaying substance is there, whether animal or vegetable, which does not form the site for a crop of the minute fungoid moulds: how soon does the lichen almost incorporate itself with, and cover with bright warm colour, the "cold grey stone!"—and these are but the beginnings, which end in the magnificence of the forest oak, counting its age in centuries. Between the lichen and the oak, how many thousands of

"Blessed form and dyes"

* See supplementary chapter to floral months.

are there! How these thousands and ten thousands are classified, and constituted into orders and families, we have endeavoured to illustrate by a few, a very few, instances. To some readers, perhaps, our faint outline sketch will afford just such a general view of this great and important, this most beautiful section of God's creation, as they desire; to others it may be but the guide-post pointing to explanations replete with the interest, to domains of knowledge

> "Where every bush and tufted tree
> Warbles sweet philosophy"—

to pursuits which bring health to the body, pleasant thoughts to the mind, and pure affections to the heart.

PART III.

MONTHLY ILLUSTRATIONS OF BRITISH WILD FLOWERS.

A BOTANICAL EXCURSION.

Hitherto, our botanical lessons may have taken our readers no further than their reading table or easy chair; but now we must beg them to change the slippers for walking shoes, and good stout ones withal, and go forth with us into the fields in search of our practical experiences. Many a pleasant ramble will they have, if their experience should be similar to the author's; and, if they are in life's spring-time, many a pleasing reminiscence for its after time will they lay up for themselves, many a green sunny spot in life's chequered landscape to look back upon. Few scenes in life will better bear retrospection than a happy botanical day spent in congenial company. But such recollections, perhaps, press more strongly upon those whose early botanical life was intermingled with that of many others, as in the case of fellow students at a university. The University of Edinburgh has for many years been known as the "Alma Mater" of many enthusiastic botanists; nor has it, under the rule of the present respected professor of the science, lost any of the *prestige* which it acquired when the manly, frank Professor Robert Graham

so successfully stimulated his students to the cultivation of botany. The success of the Edinburgh system of botanical teaching is perhaps greatly owing, first, to the circumstance, that whilst the lecture-room is not neglected, neither are the fields, and the Saturday excursions give force and interest to the lessons of the past week; and second, to the almost unrivalled opportunities for botanical exploration which exist in the environs of the beautiful capital of the north. Let the first parts of our little work be to our readers as the lecture in the class-room, and our following "Monthly Illustrations" stand as the Saturday ramble—the latter the practical exposition of the former, and, therefore, at times it may be involving some repetitions both of matter and of illustration.

We have said so much about these students' botanical excursions, that we must give a sketch of one of the best; moreover, that this very excursion is pleasingly remembered by others than the author he has evidence from recently meeting with a notice of it in a Madras Journal, now edited by one of the merriest and most enthusiastic of those who took part in it.

The rendezvous for one of the Saturdays of July, 1835, had been fixed at the village of Currie, six miles from Edinburgh, not then of course, as now, a railway station; and, as botanists do not ride, it was walking distance. The trysting time at the inn eight o'clock, and breakfast ready; six, therefore, must be the time to start from town. As bright a July morning as ever dawned it was as the author with one friend, now the Madras editor, Dr. Alexander Hunter, started for the meet. Parties of twos,

threes, and fours soon gathered, all tending towards the same destination, and before the quarter after eight had elapsed, upwards of fifty young men were gathered in the large room of the inn, eagerly looking for the advent of the rolls, the eggs, and all et-ceteras which were to satisfy appetites sharpened by a six-mile walk. Fearful would have been the consternation of our host had this inroad come upon him unprepared ; but two days' notice, and a previous knowledge of botanical appetites—by no means vegetarian, however—had served to allow ample provision, testified by the clothes-baskets heaped full of rolls, the huge wickers of eggs, the beef and the hams.

Almost we hear now the merry laughter of that breakfast table, almost see the air of *bonhomie* with which our good professor, after himself diving to the kitchen, re-appeared with another basket of eggs, when all were thought to be exhausted ere appetites were satisfied. Almost can we see the grave humour beaming in the genuine Scottish face of "Old Macnab," known far and wide in Europe as the skilful manager of the Botanic Gardens, the professor's lieutenant, and whose walking powers of threescore could tire out many, if not most, of the younger limbs then present. Now and then would the laugh become doubly hearty as some laggard straggled in late, and looked ruefully around at the almost cleared board. But, breakfast over, then came the start for the hills and moorlands which were to be the scene of the day's explorations. Most of the band were really practical botanists, were well shod for the purpose, wore the light shooting-jacket and light cap, and carried boxes which would hold good store of

plants; not a few with good stout hand-spades slung to the wrist or button-hole; some only evidenced their novitiate by appearing in white trousers and natty boots, of whom more hereafter.

A short two miles, and the first exploring ground is reached, an extensive bog, where grew not only most of our common bog-plants, but a few rarer species; one, more especially, of the orchis family, the *spurless coral-root*, found only in a very few situations in Scotland. No sportsman can feel more eager interest than the enthusiastic botanist in search of a rare plant—the plant was soon found, but well was that bog searched over, and more than once did eagerness or ignorance lead some to venture on treacherous surfaces, to find themselves, without warning, sunk up to the middle in the black bog-water. To the men of strong shoes and rough trousers this was but a small calamity; but woe betide the well-cut boot and white inexpressibles, whose luckless owner had the laughs of the entire party to meet. By high noon, the bog having been exhausted, the hills had to be breasted, and more than one covey of grouse whirred off from among the patches of the mountain cloudberry (*Rubus chamæmorus*), to reach which formed the outside limit of the excursion. Then, along the dry, open moorlands, gathering on our way the small white butterfly orchis (the *Habenaria albida*), the curious little fern moonwort (*Botrychium lunaria*), and many others, till we come to, in a small hill bog, the thread-like stems of the cranberry (*Vaccinium Oxycoccus*) resting on the surface of the white sphagnum moss, and bearing its rose-coloured blossoms and berries together. But the sun of this

July day has shone fiercely, and by three o'clock thirst oppresses many who have not had a sip from a pocket flask of cold tea or wine and water. There, on the side of "the black hill," a line of fresh green tells that a spring rises no far way up, and sure enough we find it, clear and pure as only these hill streams are—cold, too, almost too cold for safety; but many a thirsty one drinks from the "diamond of the desert" notwithstanding. Thirst quenched, ere long something tells that the stomach has long since disposed of the ample supplies of the morning. Some had been careful enough to provide a biscuit, or to pocket a roll from the breakfast table; and some were happy enough to own such a provident friend willing to share with them; but the supplies were sadly scanty.

There is the Professor—his tall handsome form was ever distinguishable—striding off to that hill farm steading—or rather on Scottish ground "farm town;" and soon his hearty call is heard. He has bought up the whole of the good wife's dairy store, and milk, food and drink together, is there for the whole party. We wonder if the good woman ever had her milk pans so thoroughly cleared before—they were then.

Another stretch across the moorland, a search down the narrow glen of the bonny burn which makes its way through it, in alternate stream cascade and pool, stream and cascade again, and seven o'clock in the evening finds most of the party—some few had deserted early in the day—at the scene of the morning breakfast. But, alas! our host had not calculated upon an evening foray as well as a morning raid, and the late furnishing of comestibles was but scant

compared with the early—actually there was not enough. One of the party we detected—we almost think it was our friend of Madras—laying violent hands on some rather musty beef bones in the pantry, which the host had been ashamed to bring out.

Then came the dispersion. Some, unused to the exertion, must stop at the inn, some lagged on the road, some stopped at the half-way village; and a few only, with the professor and his veteran lieutenant, marched into town at ten o'clock, well tired, but well satisfied, and one at least of the party to remember the day as one of those green spots in life's retrospect, which, like a thing of beauty,

"Is a joy for ever."

But now the shade. Ere the next summer flowers were blossoming, some of the merry laughers of that excursion were laid low by fever caught in the study of their profession in the hospital wards; another year or two, and all were dispersed on their several roads of life. Short roads to some, very short. A West Indian appointment with one led to yellow fever and an early grave: one, at least, fell in the Khyber Pass under the knives of the Affghans; consumption and other diseases have claimed their victims, and Graham and Macnab fill respected graves; yet many live engaged in the successful exercise of their profession, and may sometimes lighten anxious thought by a recal of the botanical rambles of student days.

Perhaps our readers will accept our narrative as a practical exposition of the uses and pleasures of botanical pursuits. True, those engaged in the expedition were most, if not all, destined for the medical

profession: but why should not a band of young clergymen do the same? gather health and strength and pleasant thoughts—ay, and good illustrations, too, for their sermons, amid the glorious works, the beautiful material revelation of the Creator, whose other revelation it will be the business of their lives to carry forth to men. Nay, if we must add to the argument, did not He who gave us that revelation illustrate his own sermon—*the Sermon*—by a reference to flowers?—

"Flowers! when the Saviour's calm benignant eye
Fell on your gentle beauty; when from you
That heavenly lesson for all hearts he drew,
Eternal, universal as the sky;—
Then in the bosom of your purity,
A voice he set as in the temple shrine;
That life's quick travellers ne'er might pass you by,
Unwarned of that sweet oracle divine.
And though too oft its low celestial sound
By the harsh notes of work-day care is drowned,
And the loud steps of vain, unlistening haste;
Yet the great Ocean hath no tone of power
Mightier to reach the soul in thought's hush'd hour
Than yours, meek lilies, chosen thus and graced."

MRS. HEMANS.

But we hear some reader remark, Why are these pleasures to be enjoyed only by young medical men or young clergymen? Surely others may band together for the like purposes? And surely they may. We would see the school class, the naturalist's club, the association of any kind, promoting alike their health, their good fellowship, their knowledge of the useful and of the beautiful in God's created works, by practically searching them out—not flowers only, not one department of the kingdoms of Nature, but all. The formation of the earth, its rocks and stones and shells, as well as its plants and trees, its birds

and its insects—*the study of these will give real improvement to the mind, quicken, as no other studies perhaps can, the powers of observation and of accurate perception.* They will exercise the memory; and they ought to call forth, not only the intellectual but the reflective faculties, ascending till they reach the highest—veneration for the Supreme Being. Thus will the mind ascend from Nature to Nature's God. Like the angels in Jacob's vision, the thoughts first "ascending," will then "descend" laden with blessings. Most unaccountable has been the neglect hitherto of the natural sciences as a part of the system of education in this country. The cry has been, "*Cui bono?*" "What profit are these things?" The remark, "It is all very well for medical men to learn them as a part of their profession; but the future clergyman must keep to his classics and mathematics, the intended merchant to his double and single entry." The time for such arguments has passed away never to return. Now it can be seen that the acquisition of a knowledge of classics and of natural science is not incompatible; nay, it is pretty well acknowledged, that some of the long dreary years which it has been the custom to devote to Greek and Latin may be allotted to the studies we advocate, with greater advantage to the general cultivation of the mind; that the intellectual education is no loser, the heart education has great gain. Moreover, it is every now and then found out that a good knowledge of natural science may become a source of profit pecuniarily to the merchant, or to the traveller, whom it enables to take advantage of circumstances which are hid from the eyes of the ignorant. Enough, let

us turn to our "Monthly Illustrations." As might be expected, the first months of the year offer but slight matter in the way of wild-flower blossomings; advantage, therefore, has been taken of this to give a few requisite directions respecting the collecting and preserving of plants; and in like manner, in the concluding months of the year, when

> "The dead leaves strew the forest walk,
> And withered are the pale wild flowers,"

we have chosen the time to tell our readers somewhat of the fruits and seeds, which are alike the harvest of the fowls of the air which sow not, reap not, nor gather into barns, and the great storehouse whence He who made them raises the "blooming wonders" of another summer.

Monthly Illustrations.

JANUARY.

"Lo! when the buds expand, the leaves are green,
Then the first opening of the flower is seen;
Then come the humid breath and rosy smile,
That with their sweets the willing sense beguile;
But as we look, and love, and taste and praise,
And the fruit grows, the charming flower decays;
Till all is gathered, and the wintry blast
Mourns o'er the place of love and pleasure past."—Crabbe.

The changes described by the poet are indeed full of interest and beauty, from the time when "the buds expand," and the "leaves are green," till the once bright foliage falls brown and withered before the "wintry blast." Few, perhaps, are so dull of mind as to be totally insensible to these changes in their general manifestations; but few, too few, have their minds awakened to the succession of beautiful and varied form which year by year adorns our fields and woods, our rocks and moorlands—nay, even our hedgesides and ditches; too few of those who have ample opportunity and leisure know, even by sight, much less by name, our commonest wild flowers; and yet there is not one of these, from the humblest weed that grows, that will not yield abundant scope for study, that does not exhibit perfection and beauty of structure that tell of its Divine Creator. Nothing, perhaps, astonishes an individual more, when first commencing the search for and study of our uncelti-

JANUARY & FEBRUARY

vated plants, than to find, even in the most common-place walk, what an immense variety of different kinds—species, as they are called botanically—he has, day by day, perhaps trodden under foot, without an idea of their existence. Interest succeeds astonishment; he finds a new source of pleasure opened up, and one which gives not only pure and healthy thoughts to the mind, but health to the body, by affording inducements to exercise, and adding to the latter that excitement which gives it a tenfold value.

Few pursuits in which the mind can engage are purer, or have more tendency to afford innocent and happy thoughts, than the study of flowers generally; and though it may be some advantage to possess gardens and conservatories well stocked with the gorgeous natives of other climates, the mere contemplation of these can never bring half the pleasurable excitement which the search after the wild denizens of our own country affords to the zealous collector and student. The former are the privileges of the rich, the latter are open to the poorest in the land; they are—

> "A blessing given
> E'en to the poorest little one
> That wanders 'neath the vault of heaven."

And now the blessed facility of the railway affords, even to the dweller in the heart of the Great Metropolis itself, opportunity, if he will, of practically studying one branch at least of natural history, which few who take up ever entirely abandon, and which many cultivate with the utmost zeal. Moreover, no other department of study requires such simple means for its prosecution, such trifling outlay in

money. A magnifying glass and a couple of long needles will open up much that is beautiful and wonderful, and if the observer desires to preserve the objects of his study, a few sheets of paper, a board, and a heavy stone, is all the apparatus required. As in the present month—January—any notice of flowers must necessarily be extremely short, advantage has been taken to make the above general remarks; and as February is not much more prolific in subjects, we shall give under the head of that month—along with the flower list—a few plain directions on the mode of collecting, preserving, and drying plants.

As, however, the mere collecting and drying of wild flowers can only be considered an amusement yielding comparatively little profit to the mind, the botanical learner ought, *as a first step to more extended knowledge*, to acquire the power of distinguishing plants from one another with accuracy and certainty, even though these plants have been previously unknown to him. To enable a person to do this, some knowledge of the organs of plants—Botanical Organography as it is called—and also of botanical terms—Terminology—is requisite; but sufficient for the purpose may quickly be acquired by a little attention. We do not, of course, recommend that any one should rest content with so superficial an accomplishment as the mere power of distinguishing one plant from another by name; but it is a beginning which, once made, will be the means of enticing many to a more extensive study of a most interesting science. The power of distinguishing plants, of making out their names, and thus of learning more

about them, is given by a book, usually called a "Flora," that is, a book containing a classified list of the wild plants of any country or district, described according to certain rules. Such a work, therefore, is indispensable to those who wish to prosecute their botanical studies properly. Various floras of Britain have been published; the best, probably, is that of Hooker and Arnott, though there are others at less price. Some information respecting the classification of plants, and of the rules according to which it is conducted, our readers will derive by reference to Part II. in the present volume.

Again, it is repeated, the study of botany, and particularly of the wild flowers, is the branch of natural history most generally accessible to all. That it may be cultivated successfully even by those who apparently have no facility for it whatever, is evident from the well-known fact, that some of the most zealous botanical collectors in the kingdom are to be found among the working-men of Manchester. One word is here necessary to prevent misapprehension. In using the word *flower*, it is not meant to indicate those plants solely which attract and delight the eye, but *all uncultivated plants*, from what are classed as the meanest weeds upwards. There is not one which does not become to the careful examiner interesting and beautiful, which does not tell of Him who

> "Might have made enough, enough,
> For every want of ours,
> For medicine, luxury, and for toil,
> And yet have made no flowers."

Wild flowers of January! What shall we, what can we say of them? The cold and ungenial month

gives, indeed, but little encouragement to the intending and inexperienced collector and observer of wild flowers, although to the confirmed botanist it yields many objects of interest amid the lower tribes of vegetable existence; many of these, such as the lichens, being now gathered in perfection.

Even in January, however, especially if the weather is open, a walk may be gladdened by the sight of one or two flowers which seem at home in every month of the twelve. Best and longest known of all, the "modest, crimson-tipped flower," the daisy—or, as Chaucer calls it, day's-eye—rears its blossoms in all seasons, and in almost every situation, on "hill and dale, and desert sod." Pluck it, and look at it; it is not one flower, but many; it belongs to the composite flowers, that is, its head or blossom is composed of numerous florets inclosed in one green envelope, or, as it is called, *involucre*—Fig. 115, 1—which resembles the calyx, or green cup of single flowers, but yet is not a true calyx. Do not, however, confound the compound flower of the daisy with the double flowers of cultivation; these, such as the rose, are not composed of florets, but of leaves, or rather, as they are called, petals, and their green cup is a true calyx. The botanical name of the daisy, *Bellis perennis*, is derived from the Latin, expressive of prettiness, and its French name, "Marguerite," like our Margaret, from the word for a

115. Composite head of common Daisy—1, general involucre.

pearl. The composite class of plants to which the daisy belongs is a very numerous one; of it, the common dandelion is another most familiar example, likewise the hawkweed, also the groundsel, familiar to bird-fanciers, which, like the daisy, may often be found in blossom in January. Get a head of groundsel, compare its structure with that of the daisy, and although you may not quite understand the science of the matter, you will at least see the resemblance, the relationship between the two, and thus begin, even in January, lessons in practical botany. Moreover, when you have got home from your winter's walk, and doffed the thick botanical shoes we recommended a few pages back, take up our little volume, and refer to what is said of the natural family of the composites; one of the greatest families is it, indeed, of the vegetable world; for it is said to claim about one-tenth of the known flowering plants for its own.

But we have not done with our January Flora; the gay golden blossoms of the gorse will often attract the eye most pleasantly on the banks, generally indeed few and far between, but now and then in some sheltered sunny nook, in a thickly-clustered mass. The gorse flower is very different from the composite blossoms above named; it belongs to the pea tribes, as the slightest examination will show. There is the form which has given the designation of papilionaceous, or butterfly-like, to these plants, and which is exhibited more fully developed in the common pea. These plants, too, are further distinguished by bearing their seeds in pods, whence they are also named "leguminous" plants. The

"order" of the *Leguminosæ* yields to man some of the most valuable productions of the vegetable kingdom, which are used either for food or medicine, or in the arts.

FEBRUARY.

"Bring flowers!" * *
* * * * * * *

"They speak of hope to the fainting heart,
With a voice of promise they come and part,
They sleep in dust through the winter hours,
They break forth in glory—bring flowers, bright flowers!"

MRS. HEMANS.

THE shortness of our floral calendar allows us space for preparatory remarks which will guide the botanical explorer when the warmth of spring and the showers of April have "decked the earth with flowers," and given him practical field-work to learn and do. As we have said in the paper for January, in the term "wild flowers" is included what people generally call weeds; for every one, even the lowliest, however apparently insignificant, will be found really and truly a flower of beauty. With these, therefore, as being generally the most accessible, the collector will probably begin his labours. Not that we would confine him to the less ornamental and attractive; but let him not wait the latter qualities in the objects of his care: he should seize on the first blossom, whether it be chickweed, or daisy, or any other—take lens, and dissecting-knife, and needle in hand—and he will quickly find that in the close examination even of a weed, the comparative familiarity which perhaps has induced contempt is soon lost in the new interests awakened.

It is of course impossible, in the allotted space for these papers, to include mention of all the wild plants which grow and blossom within the shores of the United Kingdom; sufficient if they fulfil their intention of furnishing general indications of the many flowers which, month after month, bloom unseen where they ought to be seen, and noted and recorded in the minds of both young and old, as characteristic of locality and indicative of season.

We have just used the words "characteristic of the locality." They lead to a consideration as to how plants are distributed over the earth—their geography. This, in its wide sense, is a most interesting department of botanical science; but, even in the most confined limits, the young plant collector will quickly become alive to the effect of situation in altering the kinds of vegetation he meets with. The plants of the rich meadow, and of the river side, he will soon see are very different from those of the upland field, or of the moor-land; those of the moist wood from those of the exposed rock or of the sea-shore. Of course, the extent to which these observations will be made, must vary with the district in which the observer resides, or with those which he visits; but they are to be made most interestingly in all. Again, there are some plants so common that they are found nearly in every situation; others very commonly in similar situations; and others only in particular districts; while some are known to grow only in one or two localities. These are the "rare plants" sought after by enthusiastic botanists. There are few districts in Britain in which some rare plants do not occur; the search for

them will always form a pleasing excitement when the collector has become familiarized with the commoner vegetation.

Botanists speak of the place of growth of a plant as its "habitat." The habitats of many unusual plants have been known and regularly visited for many years.

We will now suppose the observer for the first time preparing for his floral campaign. If he aspire to something of science, he may have attained some knowledge of botanical matters, and procured to himself one of the Floras mentioned in January, and added, perhaps, a lens, or small microscope: but let not those whose means, inclinations, or time, forbid this extent of preparation, be discouraged from collecting; for even in it they will find great bodily good, and no little mental pleasure and profit. Soon will they learn to see plants they never saw before, and to see differences they could never previously detect. They will not call every umbelliferous plant hemlock, and every composite one dandelion; but they will see that there are many varieties possessing a general family likeness, which are nevertheless essentially different. This very seeing is a good exercise for the mind, and gives quickness and accuracy to the eye: it is most beneficial to the young especially, and in after-life makes the distinction between "eyes and no eyes." Perhaps, had such pursuits been more attended to, many travellers would furnish less meagre accounts of foreign lands than they do. Again, the plants collected have to be brought home and preserved: here is another exercise requiring care and neatness. Being dried, they are to be mounted, and, if possible,

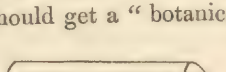
named. If the collector cannot do this himself, he may, possibly, get some one to do it for him, and then, his dried garden of wildlings, his "hortus siccus," or "herbarium," will be, even though he is otherwise ignorant, a book of reference and comparison, and study; and not only that, if he has noted places and dates of gathering, it will be a diary of the past, its review by the fireside of winter will carry the mind to the green fields and leafy woods of summer, to pleasant walks with pleasant friends—for plant-collecting is a sociable employment—and mayhap, in long after years, the sight of the dried wild flower will bring vividly back to the mind the faces and forms of those in whose company it was gathered, but who have long been parted from the gazer in the varied paths of life, or who are sleeping, it may be, beneath the daisy-sod of Britain, or haply under the shade of foreign trees. Few who have botanized in youth cannot moralize in maturer age over the dried forms of their favourites; and few who have once engaged in collecting plants ever lose the recollection of their study, or the interest it inspired. These may lie dormant under the load of business and worldly cares, especially if the lot be cast in a large town; but let the once botanical collector escape but for a day into the fields and woods, and he has an interest and a pleasure in renewing his old associations and acquaintances that others have not. We would say, therefore, observe, collect, and preserve the wild flowers, scientifically if your means and time permit; if not, observe and collect them as beautiful and interesting objects of study, as an exercise for the eye and mind. Preserve them as an

exercise for the hand; and to the young, preserve them as a pleasing record of times, of scenes, of "old familiar faces," which they will recall when age

"Looks
All ways, and ponders on the past."

We have made a digression, not, it is trusted, quite unprofitably; but we must not forget that our incipient botanist is waiting to make his preparations. Now, as we suppose that he wishes to preserve the wild flowers, for which he may have searched many a bank and walked many a mile, there ought to be some preparation for doing so before the gathering. For this purpose there is required—paper, one or more stout boards, according to the extent of the collector's intentions, and weights to press the plants. As to the paper, those who can afford it, and desire to have things of the best, should provide themselves with the grey absorbent paper used by botanists; but as a good deal is required, and thus it comes expensive, a very good substitute may be found in old newspapers, and in these many a good herbarium has been dried. Provide them as largely as possible. Next, as to the boards:—properly, these should be about eighteen inches long by eleven broad, and half an inch thick, the ends being formed by cross pieces, like a drawing-board, to prevent warping; most, however, will be content with simple boards, which, if they are procured new, should be of the dimensions above stated. Indeed, one board of the thickness mentioned will suffice for the uppermost, and intermediate thinner boards may be employed. Paper and boards being procured, the weight, such as one or more heavy stones, or bricks,

is an easy matter; indeed any weight is sufficient, and is much preferable to the screw press at times used.* The home preserving apparatus being ready, the field accoutrements require attention. Certainly, the hand, or handkerchief, or the hat, will do to carry a plant; the latter, especially at a pinch, is not an unusual receptacle; but those who really wish to preserve their plants should get a "botanical box"—Fig. 116; that, is a box similar to what are called sandwich-boxes, only on a larger scale. These boxes, made of japanned tin, are procurable in any large town.

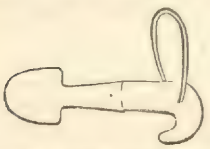


116. Botanical Box made of japanned tin, for carrying plants.

It is a mistake to get this box too small; botanists have it eighteen inches in length, and it is of little use if less than a foot, unless, indeed, it be a small pocket box, for small plants. The width of the large box is from six to eight inches, and its depth four. It should be convex as represented, the door fastening by a sliding bolt of wire. In addition to the box, botanists carry a portfolio, or light boards containing drying paper; for preserving some plants which easily shed their blossoms this is useful. For getting plants up by the roots, a stout large knife, at least, should be used; but where the equipment is complete, a short "digger," or hand "spud" of

* We have lately seen a lady using a very neat and efficient system of weights, made by enclosing a couple of bricks in common coloured glazed calico, bracing the parcel together with coloured cord, which was formed into a loop for lifting by. As many of these brick weights may, of course, be used as needful; they are neat and clean enough to be introduced into a room, and the separate weight of each is no more than any one may lift with ease: moreover, they pack closely, and make even pressure.

the form represented—Fig. 117—is carried. Such are the few simple preparations by means of which many a beautiful tenant of the wild may be gathered in *perfection*,—carried safely home, and preserved, a record and a reference for years. As the nature of the vegetation kept back by the cold winds of March will yet permit of space in the article for that month, the methods of collecting, preserving, &c., will then be gone into further.



117. Botanical digger, or hand-spade, for getting up plants by the roots.

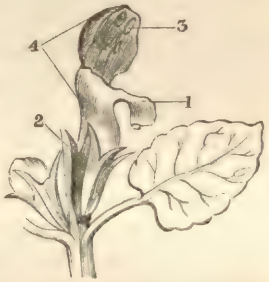
The flower list for February, although somewhat more extended than that for the previous month, is still necessarily scanty; but even greater dearth of floral ornament might be atoned for by "The early herald of the infant year," the elegant snow-drop. Well known and gladly welcomed by all as the earliest real spring flower of the garden, it is also found growing wild in many places. Observe its pair of straight-veined, pale green leaves; its true bulb; its bell-shaped flower composed of six pieces, three in each row, enclosing the six stamens, which bear the "pollen" or flower-dust. The snowdrop affords us a good specimen of the characteristics of one of the great divisions of the vegetable kingdom—the *Monocotyledons*—which includes the palm tribes, the grasses and grains, and many others most important to man. Of all these, one great external feature is the parallel veining of the leaves, in contradistinction to the branch and cross-veined leaves of such plants as the daisy, the ivy, &c., and of the trees generally of this climate. A garden flower

like the snowdrop, and like it a doubtful wildling, the yellow winter aconite, a member of the ranunculus tribe, appears this month, and the mezereon or Daphne mezereum makes the border gay with its thickly-covered flower branches and pink blossoms. It is said to occur in a wild state, but this is doubtful. Not so, however, with regard to the less brightly-coloured but more elegant Daphne laureola, or spurge laurel, which is not uncommon in woods, and flowers in this month. When most other shrubs and trees are leafless, this little shrub presents a most pleasing contrast to their naked branches, with its deep green, palm-like tuft of leaves situated at the extremity of the few branching stems, and covering the pale-green pendent slightly odorous flowers. Count the stamens within, you will find them eight in number, thus placing the plant in the Linnæan class Octandria. If the spring be a mild one, perhaps some early "catkins" of the hazel, as the pendent blossoms of that well-known tree are named, may be found to afford us a specimen of flowers which do not bear fruit—of barren, or, as they are also called, male flowers. A little examination will show that the cylindrical wavy catkin—Fig. 118—which drops its yellow gold-dust all around, consists

118. Blossom of common Hazel. 1, the catkin, or pendent spike of barren blossoms—2, the fertile blossoms bearing the nut.

of stamens only, each set of eight being covered by its scale. The germs of the future nut must be sought elsewhere. Look a little along the branch, and you will see—Fig. 118, 2—what might be mistaken for a bud, were it not that from its extremity there protrude a number of brilliant crimson filaments. At the base of these lie the future nut germs, which in due time will be ready for the hands of the gatherer. The hazel offers us an excellent example of a plant bearing barren and fertile, or, as they are often called, male and female flowers, on the same plant, but different in situation, and most different in appearance. The common blue periwinkle, so common in our gardens, sometimes occurs in the woods, and presents its bright blue flowers even thus early in the year; and in some sheltered situations we may find an adventurous sweet violet (*Viola odorata*). The dingy hellebores, with their green purple-edged flowers, are seen in gardens, and occasionally on heaps of rubbish near houses. With these we might conclude the list of February wild flowers. There, however, remains the common red or dead nettle. This plant, like the daisy, may be found blossoming in almost every month of the year. It should now be examined as a specimen of a large family of plants, the *Labiatæ*, or labiate plants, so called from the shape of the flower or corolla, which presents the appearance of an under lip. If one of the "irregular" flowers of the red nettle—Fig. 119—be compared with those of the periwinkle, how different they are! and yet the same essential parts appear in each. In the dead nettle, the corolla (4), with its lip (1), is irregular; the

stamens, four in number (3), rise to the top of the hood. Two of these organs in labiate flowers generally are almost invariably longer than the other two, and hence is derived a valuable distinctive mark of this "order" of plants. Rising into the open part of the flower, along with the stamens may be found the "style" cleft at the top. Next examine the green "calyx," or flower-cup, of the dead-nettle (2); it will be found, like the corolla, irregular, and enclosing the four-lobed seed-vessel which lies at its base. The above are instances of the distinctive marks selected by botanists to distinguish plants from one another, and, common weed as the one chosen for description may be, it is a good example of the order of plants to which it belongs. It does not, however, display one very common property of labiate plants, the essential oil, which in the mints, lavender, &c. &c. renders them so useful to man. Our February wild flowers are not, it is true, numerous; but, as we have just seen, much may be learned from them; it will be well for the novice in botanical matters to learn from *them* all he can, before he is overwhelmed with the profusion of the summer months, now fast coming on.



119. Blossoms of common Dead-nettle, showing the labiate corolla —4, the calyx—2, the stamens, two long and two short—3.

MARCH.

"The bloom is in the bud, and the bud is on the bough,
And earth is grown an emerald and heaven a sapphire now;
The snowdrop and the daisy wild are laughing everywhere,
And the balmy breath of opening buds steals softly through the air."

* * * * * * *

"What promise in the verdant plains—what hope is on the wing,
A blessing on thy balmy breath, thou merry month of Spring."

"THE merry month of Spring" is rather a time of promise to the expectant botanist, than of actual floral abundance. There are, it is true, days of bright and often of warm sunshine, when the fields are "emerald" with the fresh green of the newly-springing grass, when the clearness of the "sapphire" sky tells of approaching summer days, and when "the busy hum of insect crowds, all full of life and joy," speaks of animated nature reviving from the torpidity of winter; but there are also many days when cold winds and sleety showers forbid the ramble, and check the incipient vegetation. Nevertheless, the list of plants which now blossom has considerably increased since last month, and we must haste, ere we are overwhelmed with the bounties of Flora's cornucopia, to complete the remarks on

COLLECTING AND PRESERVING.

It must here be impressed upon the mind of the reader, that to collect plants and to collect flowers are two very different things. It is surprising, even in the collections of those who have made considerable advance in botanical lore, to see how often

MARCH & APRIL

miserable fragments of plants are presented as specimens. There is, perhaps, a single flower, with one or at most two leaves attached, but guiltless of anything like stem, root, stem and root-leaves, seed-vessels, &c., which go to make up a perfect plant. Such specimens are nearly useless, and as it is almost waste of time preserving them at all, those who desire to have a really interesting collection, should, from the commencement, seek both to avoid the error pointed out, and to get the plants on which they bestow their trouble as perfect of their kind as possible. Thus, unless actually prevented by its size, the entire plant should be taken—dug up from the roots. In the case of plants which are rarely met with, the botanist must often content himself with the specimen as he finds it; but amid the commoner species, he ought to pick and choose, to select an example as perfect in every way as he can; the leaves should be well-grown, and not marred by insects or other causes; and, if possible, the same plant should have buds, full-grown flowers, and formed seed-vessels. One of the greatest points of interest, and indeed of use to the mind, connected with the study of plants, is the detection and comparison of those minute differences in which the distinction of species are founded; and, obviously, this cannot be done by means of half-perfect specimens. For instance, one species of ranunculus is specially characterized by possessing a bulbous root; how wanting in character must a specimen of the species be which has been simply pulled from the ground, the bulb being left behind! Such examples might be greatly multiplied. Neither is it the root alone which is

involved in the question; for if it be not taken up, the root leaves are almost necessarily left behind, and they are often eminently characteristic. One instance will suffice—that of the common blue-bell, or harebell, which derives its specific botanical name of *Rotundifolia* from its root-leaves, which are round, whereas the stem-leaves are long or linear. Unless the round root-leaves are preserved, how inapplicable must the name "round-leaved harebell" appear!—These root-leaves, however, must not be confounded with the seed-leaves or first leaves of the young plant, which appear in spring, and of which examples may everywhere be found this month. These leaves, developed directly from the seed-lobes, are, as it were, the nursing mothers of the young plants, and the observation of their various forms will afford a pleasing diversification to the botanical walk. The annexed cut—Fig. 120—which represents the seed-leaves—1, 1—and incipient plant—2—of the common goose-grass, offers a characteristic example.

120. Seedling of common Goosegrass. Seed-leaves—1; regular leaves of plant—2.

After a plant-specimen has been gathered, it is of course transferred to the box, in which it is kept fresh and cool. This effect of the close box is, per-

haps, of less consequence in the early months, but in the heat of summer it is almost necessary to keep the plants in anything like good order for drying. Indeed, during a long walk on a hot day, it is often well, if the box is not tolerably filled with fresh specimens, to line it with grass sprinkled with water. Moreover, specimens are not, after being gathered, to be consigned to safe keeping without some preparation; withered leaves should be trimmed off, and the roots cleaned, and if gathered in muddy places they should be washed. When it is necessary to mingle plants of all sizes in one box, some arrangement should be made so that the minuter species be not lost; for these, however, it is better to have a smaller pocket-box. As already mentioned, those who desire to collect in the most perfect manner ought to carry boards containing paper, into which plants of which the flowers, or as they are called botanically, the corollas, easily fall off, may be transferred at once.

After plants have been collected, they ought, with as little delay as may be, to be submitted to the drying process. For this purpose, from three to six sheets—according to the thickness and succulence of the plants—of the drying paper described in the February article are to be laid down first, and on the top sheet the plant, or plants, if there is room for more than one, are to be arranged. The root being placed towards the operator, the various parts of the specimen are to be laid evenly down, while another sheet of paper is placed on the top. To do this well, practice is of course required; and the great art is, to display the plant—the form of its leaves, flowers,

&c.—without artificial arrangement, apparent or actual. The specimen being laid down, another set of sheets of paper is to be placed before a fresh plant is put, and so on until from four to ten layers of specimens, according to their thickness, are arranged. A board is then to be put on the top of all, and on that the weight. (*See February.*)

In the course of twelve, twenty-four, or eight-and-forty hours, it will be necessary to change the sheets, which have become damp with the moisture of the specimens, for dry paper. This is very simply done, and in the process, opportunity may be taken to correct any deficiencies in the arrangement of the specimens; indeed, as these have now become limp, and have lost the springiness of life, such may at this stage often be more easily effected than at first. This changing of the moist paper for dry will require to be done at intervals, as above named, until the specimens are thoroughly dried. In the case of some plants, such as grasses, which are long and slender, the stem may be bent and re-bent upon itself, in such a way as to bring it within the compass of the paper; each bending being kept in place by insertion in a slit in a slip of paper. When the plants are thoroughly freed from moisture, they may be transferred to the collection; but if this be done too soon, the specimen shrivels, and becomes comparatively useless and unsightly. To know when a plant is quite dry requires some little experience; but it may generally be judged to be so if the leaves or other parts snap through when slightly bent. Of course, some plants require much longer time to dry than others; indeed, some, such as the grasses, ferns,

&c., scarcely require more than once changing; others which are thick and succulent, take weeks to dry, and some, such as the stone-crops, will actually grow between the drying sheets, unless first killed by immersion for a few seconds in boiling water. In the case of thick woody or fleshy stems, or of bulbs, &c., it is advisable to slice off the back half, to facilitate drying. The paper which has become damp by the moisture of one set of plants is of course to be dried for the next change. There is, perhaps, no better plan than to hang it during the night on cords stretched across a kitchen or warm room.

During the first two months of the year, few and far between are the flowering plants which dare to show their blossoms, and to expose them in all their delicacy and beauty to the nipping frosts; but now, in March, there are really flowers for the gathering; not many perhaps, but sufficient to interest and to instruct, and to exercise the powers, both of observation and of manipulation, of the incipient botanist.

One of the most conspicuous of the March wild flowers, particularly where lime prevails, is the common coltsfoot—no good sign of the land, certainly; but its bright yellow blossoms, in some places almost carpeting the soil, are very pleasing to the eye. The plant is remarkable in so far that its blossoms precede the heart-shaped leaves, which do not show themselves until the former are dying off, and are replaced by the down-crowned seed. Examine the flower-head of the coltsfoot, and you will find it similar in composition to the daisy and dandelion; that is, composed of a number of separate florets, each having at its base a seed, from which the

feathery down extends upwards, forming to the floret the calyx, and to the ripe seed that feathery parachute so well known to every child, whose would-be time-piece to mark the fleeting of the summer's day is the ripe seed-head of the dandelion. Its seeds, like those of the coltsfoot, are dispersed by means of these downy or feathery appendages, called in botanical language, the pappus. The annexed cut—Fig. 121—will perhaps bring the above parts more clearly before the mind. 1,1, are a few of the ripe seeds of the common dandelion — which is now found commonly in blossom —attached to the common seed-head or receptacle—4. This is marked by the depressions left by seeds which have become detached, and which have floated off in the atmosphere by the aid of their pappus. The divisions of the common involucre or wrapper—3—of the flower-head are reversed when the seed is ripe, having protected it—closed over it—during its progress to maturity. These are simple lessons from common plants, but they are within the reach of all, and not the most magnificent production of the vegetable kingdom can show more clearly the care and skill of the Almighty Artificer than the seed of the humble dandelion or coltsfoot in its progress to mature perfection. The flowers of the coltsfoot are a favourite domestic medicine for coughs, and in many parts of the country a wine is made from their infusion. The under surface of the

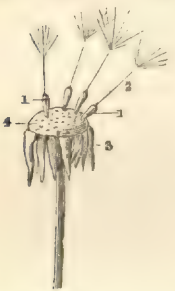


Fig. 121.

leaf is covered with a woolly down which may be used as tinder. The smoke from the burning roots is employed by the Tartars for the purpose of driving away the clouds of gnats which infest the steppes where they graze their flocks and herds.

Another of our March flowers, the common butter-bur, or *Petasites vulgaris*, is, like the coltsfoot, characterized by the appearance of the flower-heads before the leaves. In wet meadows and by the river sides, the conical spike-like heads of flesh-coloured flowers sent up by this plant are commonly met with, but perhaps few connect them with the broad large leaves which cover the ground in summer, supported on stalks about one or two feet high, and well known to children as "umbrellas." Few plants native to Britain bear leaves so large as the butter-bur, and its early blossoms afford welcome food to the bees. The coltsfoot and butter-bur, the dandelion, groundsel, and daisy, are our list of composite flowers thus far in the year. Perhaps, early in March, the eye will be attracted by a bright blue flower, almost hid amid the other plants, under the shelter of some hedge; the blossoms resemble in general form those of the common red or white dead nettles; like them they spring at intervals from the stem, which in this case is trailing, and at the base of each set of flowers are a couple of scollop-edged leaves placed opposite each other. This pretty plant is the "ground ivy," or *Nepeta glechoma*. When well dried it makes a pretty specimen—it should be compared with the red nettle described in the February paper. Another very wee blue flower may be found not far off; it is the ivy-leaved veronica—its

flowers are very small and delicate, and its stems lie close to the ground, so that it may easily escape observation: we shall speak of veronicas again. Another, *the* blue flower of Spring, the sweet-scented violet, so characteristic of the grassy lane-sides of England, though associated in name with March, is much more an April flower, and next month we shall find it companioned with others of its family. On the earthen tops of walls, on thin-soiled rocks, on thatch, the little white-flowered whitlow-grass, the *Draba verna*, now shows itself in pleasing profusion, giving us an example of a cruciferous plant, so named from the cross-like arrangement of the petals—flower-leaves—of this numerous family. This arrangement will be better seen in the blossoms of the common wallflower, now frequently to be met with. In this, as in other cruciferous plants, mark the calyx in four pieces, the petals in four pieces forming a cross-like corolla; and then pulling these away, note the six stamens—Fig. 122, 1, 1—two short and four long, surrounding the central pistil—2—which ultimately becomes developed into the seed-pod; the mind will thus carry away a very good general idea of the leading characters of a most important section of the plant kingdom—that from whence we derive our mustard, rape, cabbage, radishes, &c.

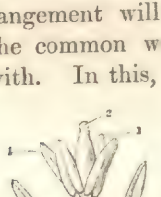


Fig. 122.

In March, flowers that singular plant the mistletoe, too well known to those in whose neighbourhood it grows to require description, and well known in

town and country, when its transparent berries form a part of the Christmas decorations. The common Mercury this month puts forth its flowers, though many would not call them flowers, for they are green, and not conspicuous. They are remarkable for their stamens and pistils, constituting male and female blossoms, being developed on different plants. This plant grows about a foot in height, often among loose stones, and forms thick patches of deep green. In drying, the leaves almost always turn black, or nearly so. Like the Mercury, the willows also bear their barren and fertile flowers separate; and every boy knows the "pussy-cats" of the willow. These are the barren or male flowers, which, when fully developed, shed showers of pollen or flower-dust on all around. In some country places, the willows are called palms, from their having been used in former times in the religious ceremonies of Palm Sunday.

The association of flowers with the religious festivals of the church is not by any means uncommon. Thus, we have the guelder-rose at Whitsuntide, the harebell for St. George's day, and the St. John's wort, as its name implies, dedicated to St. John. The alder and poplar both flower in March, and in many respects will be found to resemble the hazel described last month. The yew and the elm may be added to the catalogue. The gay crocuses and the narcissus, though occasionally found wild, rather belong to the garden border than to the field; they are, however, good examples of the same form of plants — the *Monocotyledons* — as the snowdrop. The butcher's broom is a curious shrub; it flowers in March, but its tiny blossoms are developed where

few would look for them—on the *back* of its stiff pointed leaves.

The broad-leaved wood-rush, with its hairy leaves, may now be gathered in woods; and the hare-tail cotton grass, which in summer ornaments the barren moor with its fleecy looking heads of cotton wool, also blossoms in March. These may not attract the eye at first sight, but they will repay an attentive examination, for

> "Not a flower
> But shows some touch in freckle, streak, or stain,
> Of His unrivalled pencil.
> There is not one but
> Seems, as it issues from the shapeless mould,
> An emanation of the indwelling life,
> A visible token of the upholding loves,
> That are the soul of this wide universe."

APRIL.

> "The little brooks run on in light,
> As if they had a chase of mirth;
> The skies are blue, the air is warm,
> Our very hearts have caught the charm
> That sheds a beauty over earth."
>
> MARY HOWITT.

APRIL—showery, sunshiny, "proud pied" April—is upon us. March yielded a few early blossoms, spite of its cold winds; but this month we have flowers in earnest, and the botanist and collector must begin in earnest, otherwise he will be overwhelmed with the rapid succession of "bells and flowrets of a thousand hues" that almost *now* force themselves upon his attention; mayhap, before that attention was awakened, he passed them by unheeded. A few short precepts must be added to the directions

given last month for collecting and preserving. The first is from the golden rule—Do as you would be done by. If you find a plant that you have reason to think is uncommon, take of it sufficient for specimens for yourself, and if need be for friends, but do not be greedy over it; do not strip a habitat, but leave a few specimens for other collectors, and some for seed. Never, if possible, delay longer than twenty-four hours in putting your collected plants to dry. They will, certainly, if it is necessary—as when Sunday intervenes—keep longer than the above time fresh, either in the tin collecting-box, or in water; but delay is better avoided when possible. Remember always to keep a fresh specimen for examination, if the plant is a new one to you, and make a point, if you can, of ascertaining its name, and noting this down, along with the time and place of gathering. These are little points which, unattended to at the time, are apt to be neglected altogether, and, at some future time, to be regretted.

After plants have been dried, they require mounting and arranging. The way in which they are mounted must of course depend partly upon the pecuniary means of the collector. To be so in the best manner, each species should be placed separately upon half a sheet of white paper, the same size as that recommended to be used for drying. It is usual to place one, or at most two specimens of the same species of plant, on the single half-sheet: but to put different species together is better avoided, unless indeed the expense of paper is a great object. The plants are attached to the paper, either by *light* touches of strong gum mucilage on various parts of

the stem and leaves, or by strips of paper gummed down over them. The latter plan is the more troublesome, but so far preferable that, if need be, it permits the specimen to be removed uninjured. The kind of paper used, of course, will depend upon what can be afforded, but the size ought not to be less than that mentioned above. During the botanical season—that is, while plants are being gathered and preserved—the collector may be content with transferring them when dry to their clean paper, along with their names, places of growth, &c., leaving the completion of the mounting, and the arrangement, to the time when

"The pomp of groves and garniture of fields"

has given place to the cold barrenness of winter. For the next six months at least, the wealth of summer flowers will amply occupy both our space and our readers' leisure, if they betake themselves to the pastime, or scientific pursuit, whichever they like to call or make it, of collecting and examining the wild flowers of their native soil.

Primroses: how many a hedge-bank and burn-side is made gay with these "earliest nurslings of the spring!"—"The rathe" (*early*) primrose, as Milton calls it. They have been blooming sparingly, on sheltered banks, perhaps for weeks, but now the thick tufts of their blossoms give real "evidence that spring is come" at last. The primrose is an excellent example of a plant with a regular monopetalous corolla, or, in simple language, of a symmetrical flower all in one piece, in contradistinction to those, like the wallflower, in which the petals of

the flower are separate; or to those, like the dead-nettle, foxglove, &c., in which, although in one piece, the flower is irregular. The blossoms of the primrose, apparently scattered among the leaves, all spring from one point in the centre of the tuft; and if we can imagine the various flower-stalks or peduncles uniting before reaching the base of the tuft, so that they should form a common foot-stalk, we should have a raised umbel of blossoms, like the cowslip or oxlip—which last, indeed, may almost be considered as a cross between the former and the primrose. Moreover, the polyanthus of our gardens, which has its blossoms elevated on a common foot-stalk, is simply a variety of the primrose. The primrose makes a pretty dried specimen at first; but in the course of time the flowers will turn perfectly green; and the same occurs with the cowslip, which is now coming forward in profusion in English pastures; in Scotland it is much less frequent. The primrose affords such an excellent example of a perfect flower, that we may take advantage of it to consider the arrangement of the various parts. At Fig. 123 is represented the section of a primrose blossom. 1, is the expanded limb of the corolla, which in this case ends in a tube—2. This tube encloses the seed-vessel—6—from the top of which arises the style, capped by its globular stig-

Fig. 123.

ma—4. Within the tube are the five stamens—5—the whole being surrounded by the calyx—3—and supported on the flower-stalk or peduncle—7. Pull to pieces the first primrose flower you meet with, and compare the parts; do the same with the first cowslip. Pretty favourite as the primrose is, both its leaves and flowers are rejected by all our grazing animals, pigs excepted. It seems, however, that it is not altogether despised by man, or at least woman, as an article of diet, for very lately we met with a receipt for a primrose pudding!

Companions of the primrose,

"Gleaming like amethysts in the dewy moss,"

the sweet-scented violets, the most welcome flowers, perhaps, of an English spring, are now, where they do occur, scattered in lavish profusion, not only gleaming blue like the amethysts, but in many places white. The flower of the violet—Fig. 124—contains the same parts, but differently arranged and not less beautiful, as the symmetrical primrose. The five divisions of the violet blossom are distinct from one another, and differ in shape one from the other; the lower one presenting—1—what is called, in botany, a spur. The stamens will be found connected together, and two of them with curious spur-like appendages. On the flower-stem of the violet, we have an example—2—of what are called bracts. Although we have eight species of British

Fig. 124.

violets, none are odorous but the one, the sweet-scented *Viola odorata*. The dog violet, or *Viola canina*, which rapidly succeeds the sweet-scented, has perhaps a handsomer flower; it is larger, lighter blue, and more transparent-looking. It makes a very pretty specimen. The hairy violet resembles, in some degree, the sweet-scented, but its leaves are quite rough with hairs. The marsh violet is a very pretty, transparent-looking plant; as its name indicates, its habitat is in the bogs, of which, at this season, it is a great ornament, especially in Scotland, as, later in the year, the yellow violet (*Viola lutea*) is to the moorland heaths. The *Viola tricolor*, with its varied colour, the origin of our garden pansies, may be gathered in bloom, almost the whole year round, in waste corn-fields. Primroses and violets outside the wood and at its margins, but anemones all through it, make a perfect spring picture.

Who does not know the wood anemone, or wind-flower, with its pendent blossom rising from the triple circlet involucre of beautifully-cut leaves? It is beautiful when growing, beautiful when well preserved. In getting it up, however, for a specimen, be careful to get the characteristic root and root-leaves. The pasque-flower, purple anemone, is so comparatively rare, that few perhaps of our readers, except those who botanize on chalk soils, may meet with it; those who are fortunate enough to do so will secure a great ornament to the herbarium. The anemones belong to the ranunculus tribe, and are good exemplifications of the leading characteristics of that important family. Compare the structure of their flowers with that of the common ranunculus, or buttercup, and

the similarity will at once be evident. As we see it in Fig. 125, which exhibits one of the buttercup flowers with two of the petals and some of the stamens of the flower removed, to permit the parts to be seen; so in the centre of the anemone, as of the ranunculus, is a collection of seed-vessels —4—surrounded by numerous stamens—3—which have their attachments just below the seed-vessels; external to these are the flower petals—1—in five distinct pieces; the whole being enclosed by the five calyx pieces or sepals —2. These distinctions will again be referred to when the rose-tribes, which in some particulars resemble the *Ranunculaceæ*, are treated of. The distinction is one of practical value; for whilst the *Rosaceæ* are known for the many articles of nutriment, and for the fruits which they yield, the *Ranunculaceæ* are for the most part acrid and irritating, and include such plants as the aconites, &c. Even the innocent-looking buttercup is powerfully acrid; its flowers, if chewed, excite distressing vomiting, and the bruised leaves of this and others act on the skin like a mustard-plaster. In most places the *Ranunculus Ficaria*, or lesser celandine, or pilewort, is abundant this month, distinguishable by its smooth heart-shaped leaves, its one-flowered stem, and peculiar root, consisting of a bundle of elongated tubers. It is on the bright days of spring when this plant chiefly delights to open its yellow star-like blossoms

Fig. 125.

to the sunlight, gemming the banks with its green and gold—for its leaves are very bright green, and very golden are its flowers. The lesser celandine, however, must not be confounded with the bright golden, showy *Caltha*, or marsh marigold, which is so ornamental to the sides of places where there is water. It cannot be overlooked. Examine, and you will find it has the ranunculus family likeness. As we are about the water, we may now find another member of this large family, the white water ranunculus, with its leaves often so variously cut, and sometimes not cut at all; and, almost certainly in the next moist meadow must there be plenty of the pale, lilac, "wan-hued" lady's smock, or *Cardamine pratensis;* it may happen that by the brook-side, the handsome *Cardamine amara*, with its white flowers and dark stamens, is to be gathered. But what is this queer-looking thing in the shaded thicket—a green, square head, topping a slender stalk? Very likely an incipient botanist would consider it an odd production, not at all like his idea of a flower. It is the little moschatell, or *Adoxa*. Its square head is composed of four little green flowers placed back to back, with a fifth covering the four. The plant is so peculiar, it cannot be mistaken; perhaps it is nestling under some wild gooseberry or currant bush, the blossoms of which our readers may find and examine for themselves. We must not leave the stream-side without a look for the broad-leaved garlic, (*Allium Ursinum*), for its umbels of white flowers are really handsome, and so are its broad leaves, somewhat like those of the lily of the valley; but its odour!—one can scarce have the heart to put it in

the same box with the violets, though it does belong to the lily tribes. We will contrast with the pure white of the garlic the splendid purple of the early orchis (the *Orchis mascula*), having its broad leaves marked with dark brown spots; almost certainly must it grow in the meadow-grounds. Make sure, in taking your specimens of this plant, of the two-lobed root, it is characteristic. Perhaps you may gather at the same time and place, the pasture lousewort, or *Pedicularis sylvatica*. It is a pretty, though common plant, with its rose-coloured flowers, something of the shape of the dead-nettle, and with its deeply-divided leaves. Those who live near the localities may in such meadows come upon the graceful *Fritillaria*. If they do, they will get a plant worth preserving.

Fig. 126.

Before exploring this well-wooded hill-side, we have work to do in the bank at the foot; it is covered with the bright blue-bell hyacinth, with its graceful drooping bells and delicious perfume. Mind you do not spoil specimens for the trouble of digging deep down to find the bulbs. You will want your trowel also, to reach the tuber of the arum—cuckoo-pint—which is showing its handsome spathe amid its dark-green spotted leaves. What a mysterious-looking floral arrangement there is within that protecting hood!—Fig. 126. The beginner would puzzle some time ere he made out the parts of the flower answering to those of the primrose. In botanical language, the covering—

1—is a spathe; the curious collection of bodies within constitute the spadix. At 2, are the stamens; at 3, the pistils and seed-vessels, which late in the autumn assume a brilliant red, looking almost like a bunch of coral, as, amid the withering grass of some hedge bottom, they attract the gaze of even a careless passer-by. The bodies at 4 are considered abortive germens, or seed-vessels. The tuber of the arum in its natural state contains an acrid juice, along with a considerable amount of starchy flour; the latter when freed from the acridity constitutes a nutritious article of diet. Large quantities are collected in Portland Island and sold in the neighbourhood as an article of food. In olden times, the starch of the root was used to stiffen dress, as "prepared starch" is used with us now. If the top of our bank is dry, there may blossom on it one of the mouse-ear chickweeds, with its hairy leaves and small white petalled flowers. Neither is it impossible that in the wood itself we may come upon the yellow-flowered "weasel snout," or, as it is at times called, "yellow archangel." Belonging, like the dead-nettle, to the labiate plants, its blossoms have the shape common to the order. A very odd-looking plant is not unfrequently encountered about this time of year, springing from the root of a tree such as the elm: it has no leaves, but in their place fleshy-looking scales, and its flowers are of a purple hue. It is often passed by, as it mingles with the dead leaves, which it resembles somewhat in colour. If found, you cannot fail to recognise it. Its name is the toothwort, or *Lathræa*, and it is a parasite—like the mistletoe—growing upon other plants instead of from

the ground. Periwinkles, and lungwort, or pulmonaria—the latter with its purple flowers and spotted hairy leaves—are almost better known as garden than as wild flowers; but they may be gathered at times apparently wild.

We have been so long giving our attention to the floral treasures of field and hedge-row, our eyes have looked so constantly downward, that we almost forget that this month many of our statelier trees are offering their flowers for examination. Perhaps our botanist will scarcely consider them flowers, for many of them are but dull of hue. The oak, the ash, the birch, the chestnut, are all now in blossom. Of these, all, except the ash, bear their blossoms like the hazel—the fertile flowers on one part of the stem, and the barren ones in a drooping catkin on another. Nothing can be more beautiful than the pendent tassels, as we may call them, of the birch, when the tree is in full bloom. The combination of slender drooping twigs, and of hanging blossoms, is the perfection of graceful beauty, and the place to see it is the side of a highland glen. Should any of my readers go there to look for it, they may as well go a little farther and higher, to look for the crowberry's purple flowers, which give promise of abundant food in autumn to the moor game which feed on its dark purple berries. The very large family of willows contributes its show of catkins, barren and fertile. All these it is well for the young botanist to exercise himself in examining. In the case of those trees which blossom before the leaves appear, if the flower is preserved, the leaves should be added afterwards; and in the case of the willows, care taken that the

MAY.

right leaves are placed beside their own blossoms. The box tree, which is now in blossom, offers another example of barren and fertile flowers; not in this case however, very different in appearance. The wild pear, and perhaps the crab (*Pyrus malus*), are somewhat gayer than the other trees. Our readers must know them; and we have perhaps introduced to them acquaintances enough for one month. Albeit, in the next, we have a crowd of new friends coming on; for that month is

"The delicate-footed May,
With its slight fingers *full* of leaves and flowers."

MAY.

"The welcome flowers are blossoming,
In joyous troops revealed;
They lift their dewy buds and bells
In garden, mead, and field.
They lurk in every sunless path
Where forest children tread;
They dot like stars the sacred turf
Which lies above the dead.

They sport with every playful wind
That stirs the blooming trees,
And laugh on every fragrant bush,
All full of toiling bees;
From the green marge of lake and stream,
Fresh vale and mountain sod,
They look in gentle glory forth,
The pure sweet flowers of God."—LYONS.

If March is "the merry month of spring," truly May is *the* merry month of the year.

"Of every moneth in the year,
To mirthful May there is no peer,"

says one of the many poets who have celebrated the delights of May. Doubtless, the contrast between

the previous months and this does increase the charms of the season, but there is a freshness in everything which we meet with at no other time. Opening flowers and bursting buds are everywhere, and we must be up and doing. Here a few words on plant classification would, doubtless, be serviceable to our incipient botanists; but for this we must refer them to our previous pages, and pass at once to our extended list; for "bells and flowrets," not only of a "thousand hues," but of a thousand forms, await us.

Let us improve our practical acquaintance with the Ranunculus family, the "Cuckoo-buds" and "Mary-buds" of old writers. Last month introduced us to some, and this we find others in store for us. Our first expedition shall be a field one, and we quickly encounter the upright, somewhat hairy *Ranunculus bulbosus*, with its calyx sepals folded back from its buttercup flower. Let us get the bulbous root, and then we shall be certain, and can compare with the *Ranunculus repens*, or creeping crowfoot, which is sure not to be far off. We can then see the likeness with a difference. In the next corn-fields, it is not impossible we may find the small pale-flowered corn-crowfoot (*Ranunculus arvenis*), more conspicuous later in the summer, with its large prickly-looking seed-vessels. Its flowers resemble in size those of the celery-leafed crowfoot, which, with its divided leaves, shining like those of celery, grows in pools and ditches to the height of one or two feet. Two other species of upright water ranunculus must be sought for in blossom later in the summer, but their leaves, instead of being broad, cut and in-

dented, are sharp and narrow; hence they get the English name of spearwort, instead of crowfoot. These latter species are the *Ranunculus lingua*, or greater, and the *Ranunculus flammula*, or lesser spearwort. The former is a very handsome flower; its blossoms being almost the size of those of the wild rose. The wood-crowfoot, or *Ranunculus auricomus*—Fig. 84—is by no means an unhandsome flower. It is now found in woods, shady hedge-sides, &c., and may be known by the great difference between its kidney-shaped root-leaves and its much-divided stem-leaves. One peculiarity of the petals of the ranunculus flowers, is the addition at the base of each of a little nectary. Fig. 127, 1. Pull off a petal from any one of them, and you will find it at once. As we may not refer to the Ranunculus genus again, the tall *Ranunculus acris*, or upright meadow crowfoot, which flowers in July, must not be forgotten. It derives its specific name from possessing, in a marked manner, the acrid property common to the family. It has happened that an unwary botanist, misled perhaps by the innocent-looking name of buttercup, has given himself an unintentional emetic, and spoiled his day, by carelessly chewing the flower of some of the crowfoot species. Intense burning of the throat and mouth is the consequence. Not impossibly we may gather, at the edge of some corn-field, a little flower, the *Myosurus* or mousetail, which, with its small green flowers, would not, perhaps, be recognised at first as a ranunculus connexion, which it is. When in fruit, the collected

Fig. 127.

seed-vessels have no distant resemblance to the appendage from which it derives its name.

Our morning call on the Ranunculus family has already been long enough for our limits; and their gay neighbours, the Poppies, await us. Who does not know the bright common red poppy, or *Papaver rhœas?* The *Papaver argemone* having much smaller petals, is less conspicuous when in flower, but gets the advantage when it displays its long prickly-headed seed-vessels. The opium poppy, with—when wild—its whitish flowers, with their purple base, is scarcely a British native, having usually escaped from gardens. The seed-vessels of all the poppies offer, from their size, facility for examining this part of the plant. The projecting divisions, or "dissepiments," afford attachment to numerous seeds, which, it is worthy of remark, are so mild in their properties, that in some places, as in Persia, they are made into cakes and eaten, while the seed-vessels, or capsules, which contain them, abound with the narcotic poison known as opium. Our next field friends belong to the cruciform order, of which, in our last, the wall-flower was cited as a type. Among them, the bitter yellow rocket, or *Barbarea vulgaris*, is conspicuous, with its smooth furrowed stem, its lyre-shaped leaves, and its corymbs* of yellow flowers, which become lengthened into racemes of square pods. This plant is about the same height—from one to two feet—as another of the cruciform order, popularly known as

* Probably, in the course of these papers, various botanical terms may be employed without explanations. These it will be impossible to give without interfering with space required for the notice of the flowers; moreover, they are less necessary here, as most of them are explained in the first portions of the work.

Jack-by-the hedge, which bears white flowers—the leaves heart-shaped. If these two are compared with the common water-cress (*Nasturtium officinale*), the general family likeness will be detected, and at the same time many minor differences. You need not wander far to find water-cresses, for they grow almost everywhere. But if you do wander over the earth's surface, very probably will you find water-cress in far-distant lands, where you least expect, for it is a very widely-distributed plant. Are these plants, with such finely-divided leaves, and heads drooping before they blossom, dying? Surely not: the plant is the earth-nut (*Bunium flexuosum*); well named, for it is one of the most slender of our umbelliferæ; the few specimens which are now in full blossom hold their heads erect enough when they expand their flowers. If you pull up a specimen, it comes up with a long white root, but without fibres; evidently this is not the root proper. You must take your trowel—when Caliban, in the *Tempest*, proffered his "long nails" to dig pig-nuts for Trinculo, it was because some digging was required—go deep enough, and you will reach the tuber, and get a complete specimen. The umbelliferous flowers of Britain are so numerous, especially later in the year, that they require special attention. An umbel—Fig. 128—is composed of flowers borne on footstalks, which

Fig. 128. An umbel.

all spring from one point, as represented; it may be simple or compound. The hemlock is a good example; but when we say hemlock, we mean hemlock: many people call all the umbelliferæ hemlock, because the general family feature of the umbel is so apparent to the eye; a little time and observation will correct the mistake. We must recur to this family next month; in the meanwhile, the common *Anthriscus*, or beaked parsley, will do for comparison; it is now in full flower, growing in half-shaded situations. Like the earth-nut, it droops before flowering, but it is a much larger plant; the leaves are much divided, but in broader segments than in the other, and the stem is rough with hairs.

Taking leave of the umbel-bearers for the present, our next friend is really handsome, with its large white flowers of five petals, especially when grown to its grenadier-height of twelve inches. The kidney-shaped, lobed leaves, and the root composed of a number of granules, or little tubers, in a bundle, proclaim the white meadow saxifrage, or *Saxifraga granulata*—worthy representative of one of our most interesting British genera. The ten stamens of the saxifrages place them in the Linnæan class *Decandria*. It may chance that on some dry wall, in our walk, we may pick another, but much smaller, member of the family, the rue-leaved saxifrage, or *Saxifraga tridactylites*, so named from the resemblance of its tiny reddish-looking leaves to three little fingers. The entire plant rarely reaches four inches in height. It is covered with sticky hairs. We may perchance, too, in its company—for they love the same dry soil—meet with one or more of the pearlworts,

inconspicuous plants, with narrow leaves, and with the small petals of the corolla quite overshadowed by the longer calycine sepals. These belong to the *Caryophyllaceæ*, a large and important order, of which, however, the stellarias, or stitchworts, afford us a more striking example, although that pretty little plant, the common chickweed, which is a stellaria, almost approaches the pearlworts in appearance. We will choose a more brilliant representative, the greater stitchwort, or *Stellaria holostea*, the large, pure white, star-like blossoms of which are shining underneath the shadow of that hedge. Mark its ten stamens, its three styles, the sharp lance-shaped leaves, its square, angular, and brittle stem, often lengthened among the grass, and you cannot mistake it. Should you find a plant somewhat similar, but much smaller in every way, and with very much smaller but similar flowers, you may know it for the lesser stitchwort, or *Stellaria graminea*. The very pure white of the stellaria is a brilliant contrast to the bright, almost heavenly blue of the Germander speedwell, sometimes, erroneously called forget-me-not, the *Veronica chamædrys*, which frequently grows in the same situations. This is truly a beautiful flower, and a simple one, with its bright blue flowers, which fall off so easily, each carrying with it its two stamens—Fig. 129. Look for its heart-shaped leaves, placed opposite to each other, and the lines of hairs on the stem, and you cannot err. Take it, too, as a type of one of the prettiest families in Flora's kingdom of beauties; a numerous family withal, for we have at least eighteen British species. The members are found in field

and wood, on hill and in water, and they are all so like in their beauty, they will surely be recognised,

Fig. 129.*

even though some are pale in hue, and very small. One, however, the *Veronica beccabunga*, or brooklime, which ornaments our ditches and streams, rivals even the Germander veronica in the brilliant blue of its corollas. This plant is occasionally eaten like water-cress, its leaves possessing a somewhat similar pungency. The veronicas have a sweet little rival in brightness of hue in the early field forget-me-not—we prefer the name to that of scorpion-grass—which may now be gathered abundantly on dry banks and walls. Another species, the yellow and blue *myosotis*, might perhaps be confounded with it, but its flowers are paler, and before they are fully expanded are yellow. The botanical name of these universal favourites is myosotis, derived from the Greek, signifying mouse-ear, which is applicable to the form of the leaves. Properly, the name forget-me-not belongs only to the large water myosotis, which, throughout Europe, is assumed and named as the emblem of friendship, but all the other species are known as forget-me-nots, and we may say, are used as such—treasured as such. In Germany the forget-me-not is said to derive its name from a most romantic story. A minstrel of Mayence had wandered forth to seek his fortune in the world, leaving behind him a girl to whom he was attached and betrothed; in a few years, having gained both

* The Germander speedwell; considerably magnified.

riches and reputation, he returned to seek his bride. On the eve of their wedding, as the lovers walked by the banks of the Rhine, a tuft of the bright blue myosotis attracted their attention, and in the attempt to gather them, the poor minstrel missed his footing and fell into the river. He rose, and rose again; he felt the rapid current sweeping him along, and knew that his fate was sealed; with one last effort he cast some of the flowers to the bank, and ere the waters closed over him, the words "forget me not" mingled with his last drowning cry. The story which thus tells us how the pretty little flower came by its name, also tells us that the minstrel who gave it was not forgot, and that his widowed bride died unwedded.

What a pity our next plant smells so disagreeably! for it is really a pretty one, and a great ornament to the heap of loose stones on which it grows. If you preserve it well, a pretty specimen will it look on paper, with its pink stem, beautifully-cut leaves, and pink veined, rarely pure white, corollas. It is the *Geranium Robertianum*, Herb Robert, or stinking crane's-bill; but pretty as it is, it is less so than its relative, the *Geranium lucidum*, with stems clear and shining, almost like those of a balsam, with their swollen pink jointings, and with leaves at times nearly as pink as the small pretty flowers. Should you chance on some rocky bank or earth topped wall to meet with a specimen, gather carefully, for it is very brittle. Some of our friends who have woods to search in their district, may meet with a third species of geranium, blossoming towards the end of the month, the *Geranium phæum*, or dusky crane's-

bill, a sort of negro with geranium features, for its flowers are a purple-black. Nevertheless, it is a handsome plant; and having led us into the woods in its search, we will look around. How sweetly at the base of the mossy stone, and under cover of the adjoining bank, nestles that beautiful wood-sorrel, with its bright, very bright, green trefoil leaves, and its transparent, white-veined, and slightly-drooping bells! Truly it is one of our prettiest natives, the true shamrock of Ireland; and it is difficult to imagine why the Emerald Isle gave it up, with its emerald leaves, for the plain creeping clover now called the shamrock. The wood-sorrel leaves contain a most agreeable acid, although it is the oxalic. Its seeds are each contained in a very elastic envelope, which, when they are ripe, bursts suddenly, and projects them to a considerable distance. The root of this pretty little plant resembles little beads strung together. Like the trefoil clovers, the wood-sorrel, or *Oxalis acetosella*, is a sleeper, and folds its leaves to rest at evening close. Another sweet flower, still more prized than the last—

> "Our England's lily of the May,
> Our lily of the vale,"

or "lily of the valley," loves the same shady wood-bank. Do not forget its creeping root in making prize of it. We lose its delicious perfume in drying, but our next wood friend, the *Asperula odorata*, or woodruff, rather gains by the process, and reminds one at all seasons of the hay-field. Every one knows the woodruff, with its whorled leaves and pure white but small flowers clustering at the extremity of the angular stems. White blossoms abound with

us. Here, surely, is a wild strawberry? That it is not—but it is so like one, as at one time to have been called the barren strawberry, or *Fragaria sterilis*. It is a late-flowering specimen of the *Potentilla fragariastrum*. Compare it with the specimen of the true strawberry, the *Fragaria vesca*, of which there are plenty at hand. When the fruit is ripe, you will see another difference still. Both belong to the *Rosaceæ*, an order already alluded to as bearing some resemblance to the *Ranunculaceæ*, which includes plants of very opposite character and properties from the former. Compare a strawberry, a rose, or cherry, or apple blossom—for they are all rosaceous—with a buttercup or anemone, you will find, along with other points of difference, an invariable one. In the ranunculus flower, the many stamens* are fixed just below the seed-vessels, and you may remove the calyx without disturbing them. In the rosaceous flower, the stamens are fixed on the calyx—Fig. 130—and you cannot pull it away without taking the stamens also. Remember the distinction: a ranunculus plant may always be suspected of poisonous acridity; a rosaceous one is frequently the bearer of nutritive fruit, spite of its prussic acid in its peach blossoms and kernels. We have here plenty of the Rosaceæ to verify us; for—

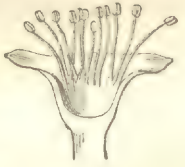


Fig. 130.

"The hawthorn's budding in the glen;
And milk-white is the slae:"†

and both belong to the order. Here, too, it the

* See Fig. 125—April. † The sloe, or blackthorn.

Pyrus aucuparia, mountain ash, or rowan tree, and the various species of Pyrus, crab apple, and wild service tree. Then we have the *Prunus* genus, capable of cultivation into plum and cherry. All these are rosaceous, and ornament our woods in May, with their white and pink blossoms often mingling in contrast with the elegant pendent racemes of the great maple, or with those of the common maple which are not pendent—a sort of shrub-tree, with deeply-wrinkled corky bark. You ought to find the berberry (*Berberis vulgaris*), displaying its drooping yellow flowers this month. You *must* examine it, if for no other reason than that its stamens exhibit vegetable irritability and movement quite as strikingly as the sensitive plant. Look for a blossom in which at least some of the stamens lie back against the petals, take any sharp-pointed instrument, and gently irritate the base of a stamen from above, it will, if the flower is fresh, at once move forward, upon the central stigma. Does the plant feel?

We may add to our list of flowering trees this month, the beech (*Fagus sylvatica*), and the Scotch fir (*Pinus sylvestris*), both of which bear barren and fertile flowers separate, and should be examined when there is opportunity. The last-mentioned tree belongs to the *Coniferæ*, or cone-bearing tribe, which also includes the juniper, now showing its diminutive catkins and berry-like cones mingled with the fruit, ripe and unripe, of former years. In hilly districts you will almost surely find it. None of our native plants present a more singular aspect than another denizen of many of the moist woods; the *Paris quadri-*

folia, or herb Paris—Fig. 131. Having once seen the delineation, you cannot mistake the plant, and will find it in flower towards the end of May. It grows about one foot high. The pretty yellow pimpernel, or loosestrife (*Lysimachia nemorum*), cannot fail to meet your eye in the wood; its stems procumbent, its leaves delicately green, smooth, ovate, and opposite, with the flowers springing from their axils; and our acquaintance with the grasses may well begin with the mountain or wood melic-grass (*Melica nutans*), one of the most elegant of an order of which we have yet much to learn.

131. Herb Paris, or Paris quadrifolia. The blossom springing from a whorl of four leaves.

Before leaving the wood we may get a specimen of the holly flower (*Ilex aquifolium*), and, if it grows near, of the spindle-tree's small white umbellated blossoms. And now we may look to the river-bank for the common comfrey (*Symphytum officinale*), with its yellowish or purple, drooping, bell-like corollas, and its leaves continued wing-like down the stem. If our river is a Scottish stream, on its banks, too, we may find the tuberous-rooted comfrey. These are not gay, but they are plants which contrast in sober handsomeness with the bright pink, fluttering, ragged-robin, sometimes called "cuckoo-flower"

(*Lychnis flos cuculi*), which ornaments alike river-bank, meadow, and moss—a pretty flower, but one you will find difficult to dry to please you. We cross the moss-ground to get to the hill. Our young botanist is attracted by an upright spike or raceme of white flowers—for flowers they are truly—they are tipped delicately with pink, and beautifully fringed. What a very handsome flower! and it cannot be rare—for here is a complete mass of its blossoms, and of large clover-like leaves, springing from matted roots, that make the moss firm beneath the feet. What is it? The common buck-bean (*Menyanthes trifoliata*), a truly lovely flower, one of the gentian tribe, and possessing that tribe's bitter medicinal properties to a valuable extent. Unfortunately, it does not dry very well. Gather a few specimens of the succulent little *Montia fontana*, from that oozy grass, if you can find its wee little white flowers, and then make for the hill-side, taking the brook, or rather, as we seem to be now wandering north the Tweed, the burn, in our way, possibly we may get the opposite-leaved golden saxifrage (*Chrysosplenium oppositifolium*); and if fortune favours, the rarer alternate-leaved one. Here at least is the first, with its deep golden-looking flowers. Albeit the colour is in the calyx, as you will see if you examine; for corolla there is none. The other species is like this, but distinguished by the shape and position of the leaves. Both plants are succulent, and of yellowish green; they are saxifrages; and, if our hill is really a hill, we shall probably find their relative the purple-flowered opposite-leaved saxifrage higher up; its tufts will soon

meet the eye if they are there. Our wandering looks so much like the highlands, that we may fall in with the dark green, woody, trailing azalea, and add its glossy leaves and flesh-coloured blossoms to our collection. What hill or burn-side is complete without the broom—the "lang yellow" golden broom—which now, and in June, looks so gay, and which is ever enlivened, the summer day through, by the humming of the bees? It is more elegant, though perhaps not so gorgeously rich as the compact mass of golden blossom presented by the whin, in England called furze or gorse—by botanists, the *Ulex Europæus*. Probably, few plants, native or foreign, present a more splendid mass of bright colour than a well-grown whinbush in blossom on a Scottish moor, in a bright June day; on Scotland's southern moors, however, for the true gorse grows but sparingly on the highland hills; it is a delicate plant, and will not stand much severe cold. Thus it was, perhaps, that the great Swedish botanist, Linnæus, having never beheld the gorse blossom in its golden glory in his own northern land, was so struck with his first view of it on an English common in the month of May, it is related of him, that falling on his knees he thanked God for a sight so beautiful. Both the plants lately mentioned, the broom—formerly *Cytisus scoparius*, now *Sarothamnus scoparius*—and the gorse, belong to the leguminous order: to be more particularly noticed next month. On heath grounds, especially in the north, you may find the sweet gale, or Dutch myrtle, a small shrubby plant, with an aromatic resinous odour, and on hill pastures generally, the *Polygala*

vulgaris, or milk-wort, "Rogation flower" of bygone times, its winged flowers varying from deep lilac, to purple, pink, and pure white; one of the prettiest of our native wildlings. Less widely diffused, but still common to hill grounds, the white blossoms and fine leaves of the *Arenaria verna* or sandwort, in some places almost carpet the ground like turf. Nowhere does this little plant grow in greater perfection than on Arthur's Seat, near Edinburgh. Almost have we overlooked the common bugle, or *Ajuga reptans*, one of the labiates, resembling slightly the ground-ivy, but with a much more erect and stouter square stem, which is conspicuous amid the grass of the moist pasture or wood, when its purple labiated flowers, and purple upper leaves, show themselves towards the end of May. Your specimen, however, will not be complete without one or more of the creeping scions which the plant sends out among the grass. Some of the rarer species of orchis blossom this month; but they are generally so conspicuous, that they are well known to those in whose neighbourhood they occur, and our May catalogue has already extended to its utmost limits. Many of the plants we have noticed are as beautiful, nay, more so, than numbers which find a place in the gay flower-border; and when found, far more prized will they be than the brightest blossom offered ready to the hand from the bounds of cultivation.

JUNE.

JUNE.

"The grass is wet with shining dews,
Their silver bells hang on each tree,
While opening flower and bursting bud
Breathe incense forth unceasingly."—MOTHERWELL.

SUMMER! Full summer have we now in its beauty and in its freshness: some, perhaps, of our Spring friends have faded; the elongated leaves of the snowdrop and primrose, the seed-vessels of the violet, tell us that their reign of beauty is over for another season; but the numbers of the "past and beauteous sisterhood" are too few, their places are too abundantly filled, to let us mark the change: we can see only the overflowing vegetation of the young Summer, the full leaf on the tree, and such wealth of flowers, that not the longest of the "bonny days of June" will suffice for excursions.

Last month we noticed one or two of the umbel-bearing plants, or *Umbelliferæ*, which might then be found in blossom; now, in June, we have many more examples of this most important family. In few districts can we go far "a-field," without meeting with the true hemlock, the *Conium maculatum*, or spotted conium; so called from its stem being marked, *maculated*, with dark purple spots. Persons generally are in the habit of calling nearly all umbel-bearing plants hemlock: the true hemlock may be known at once, and with certainty, from its being the only British umbelliferous plant with a *smooth* spotted stem. Moreover, it is further recognisable by its deep green, large, beautifully cut leaves, and by the smell, resembling that of mice, which the plant exhales when

bruised. The hemlock is an excellent type of its family. Examine its flowers, or those of any other of the umbelliferæ, which you can scarce now fail to recognise, and you will find them all more or less approaching in form and construction to the example —Fig 132. There is a small scarcely perceptible calyx—five petals, often with an inflected point—five stamens—and two styles crowning the more or less ribbed and furrowed carpels or seed-vessels. What a non-botanical person would call the seed of an umbelliferous plant—Fig. 132—is composed of two distinct carpels; which, when ripe, separate down the central line. These carpels, if cut across—Fig. 132—will be found to contain between each pair of ribs, little canals, or vittæ, which are filled with essential oil. Such seeds as the caraway, the dill, &c. &c., all belong to umbelliferous plants, and their characteristic properties depend upon the oil contained in their vittæ. We will not attempt to enter into the distinctive features of the umbelliferous plants which we may encounter in our walks, for the reason that such descriptions would afford but little aid; but nevertheless, the botanist or collector should endeavour to collect and to discriminate, if possible, with the aid of a Flora, the different species he meets with; when well preserved, the umbelliferæ, with their beautiful divided leaves, make some of the

Fig. 132.

prettiest specimens of the herbarium. As a general rule, it is observed that umbelliferous plants which grow in damp situations as their usual habitat are poisonous, and that those which are found in dry places are more generally useful aromatics. To the above, however, the aromatic angelica, used as a candied sweetmeat, is an exception; it grows in watery places.

Taking leave of our umbelliferous friends, we encounter this month many members of another equally important and extremely handsome family, the Leguminous tribe, often called the *Papilionaceous*, from the fancied resemblance of its pea-blossomed flowers to the form of the butterfly. We all know the flower of the common pea—Fig. 133—with its standard —1—its wings—2—and its keel—3—which last incloses the stamens and style, that style forming the future legume or pod. Having selected our type of the family, we cannot go far without meeting with some of the other members; we shall find them all, in Britain at least, with the same conformation. Let us turn to the clovers, a goodly connexion in themselves. Here, at our feet, is the common Dutch or white clover (*Trifolium repens*), and not far off the purple *Trifolium arvense*; towards the dry roadside we may gather one or more of the bright yellow-blossomed species. This species too, with its zigzag stems and purple blossoms, the *Trifolium medium*, you cannot mistake; look at them, and you will find them all papilionaceous, or pea-like,

Fig. 133.

only the flowers are collected into heads, and the leaves trefoil. Like trefoiled plants generally, the clovers were considered by our forefathers to be antagonistic to evil and evil things; especially were they thought to be "noisome" to witch and wizard, the united trine of the leaflets doubtless connecting the ideas with what was sacred. Close by the hedge the yellow meadow vetchling, or everlasting pea, the *Lathyrus pratensis*, gives us yet another example of a leguminous papilionaceous flower; and here, climbing in the hedge itself, we find one of our handsomest vetches, the *Vicia cracca*, or tufted vetch, with its crowded succession of bright lilac-purple blossoms, which are *imbricated* over one another, as if each sought to protect its fellow. We have a good many British vetches and vetchlings; but these pea tribes, like our umbelliferous friends, have so strong a family likeness, that any but a scientific description would scarce enable our reader to discriminate them. Collect all you can, nevertheless, and get them named as and when you can. You are certain to gather in some corn-field, where its presence is often too abundant for the farmer, a tiny little vetch-like plant, very slender and delicate, with wee pale blue flowers. You have the tare, or *Vicia hirsuta*, its little pods containing a couple of seeds; albeit, you will not distinguish this plant from its twin brother, whose chief distinction is a four-seeded pod. If you get on some dry gravelly or hill pasture, look for a leguminous plant, with its light purple flowers in a head like a trefoil, but larger individually and collectively, seeming as if much too large for the plant. It is the milk vetch, or *astragalus*—very different from ano-

ther plant, the bird's-foot, or *ornithopus*, which grows in similar situations, bearing white, red-veined flowers, but more distinguishable when its curved scimitar-like seed-pods are developed. The leaves of leguminous plants generally are compound, that is, are composed of separate leaflets, arranged on each side a central stalk, as we see in the acacias, vetches, &c.; the central stalk terminating either in a leaflet, or, in the climbing species, in a tendril. Few natural families present us with more numerous or useful articles than the *Leguminosæ:* we have food both for man and animals; medicines, such as senna; various gums, &c.; dyes, such as logwood, and many other products.

Our last step was up the hill pasture to look for the milk-vetch; if we find not that, we surely may the pretty plaited-leaved Lady's mantle, or *Alchemilla vulgaris*, growing close to the ground, with its corymbs of yellow-green flowers. Properly, the name of the alchemilla is not Lady's mantle, but "Our Lady's mantle," the plant being one of the many which were in former times connected in name with the honours paid to the Virgin Mary. "Lady's slipper," "Virgin-bower," the Lady's cushion—mossy saxifrage—are examples of similarly derived appellations. The common Lady's mantle is pretty, but far handsomer is its northern sister, the *Alchemilla alpina*, which eclipses it quite in the beauty of its leaves; these are five or six leaflets, cut or serrated at the edge, and shining underneath with a grey satiny lustre, rivalling the most brilliant productions of the loom. On dry wall-tops another little alchemilla, with small divided leaves, and greenish flowers

growing in their axils, may now be found, but it is not like its handsome sisters. The hill-side which yields us the alchemilla can scarce fail to offer the

> "Thymy mound that flings unto the winds
> Its morning incense."

We may rest awhile upon it, and gather some of its labiated purple blossoms. Well does the sweet wild thyme support the character of its family—*Labiatæ*—for odoriferous properties. Do not be surprised if you find some specimens covered with a hoary down or pubescence. Our gathering of hill plants must greatly depend on our whereabouts; but this month, and the next, we may hope for some of the beautiful saxifrages to be added to our store. Could we take a step to the southern Irish hills, we might gather the *Saxifraga umbrosa*, better known as London pride, or none so pretty, in its native wilds. Some will meet with the white-flowered dryas, a rosaceous plant, its leaves covered beneath with white down; and on our Welsh or Highland mountains, with the moss campion (*Silene acaulis*), ornamenting the rocky hill-side with its purple blossoms. And now we have one of Flora's special beauties, a real fairy plant four inches high, springing from the heath, or beneath the shadow of the moorland wood; it is the *Trientalis Europæa;* a slender stem, with one or two slender leaves at intervals on its lower portion, at length throws out a whorl of delicate green, oval leaves, from the centre of which spring one, or two, or three most elegant white flowers. The slender grace of the entire little plant is extreme—common in Scotland, it is found in the North of England only. The trientalis preserves

easily, and when well-dried, forms an elegant specimen.

Another form of beauty, but more conspicuous, have we in the bright yellow European globe flower, well known in our gardens, but only seen to perfection when waving, many flowers together, on the moor in a breezy June day. It is a handsome addition to our *Ranunculaceæ*. Somewhere on our hill ground we must meet with the stately foxglove (*Digitalis purpurea*), to which few persons require a formal introduction.

Time almost is it for us to look after some of the numerous orchis flowers which meet us in many places. We can fancy our incipient botanist considerably puzzled when he first examines an orchis flower. Where are the stamens? Where are the pistil and seed-vessel? He can make nothing of it. The *Orchideæ* are in fact eccentric, and require explanation. Fig. 134 is an orchis flower, with, like the violet, a spur—4; it is supported by its twisted seed-vessel, or ovary—3—which rises from a bract—6—on the main stem 7. At 2, we have a slightly moist spot, which answers to the pistil; and at 1, not the stamens, but the stamen-pouches: with the point of a needle open these, and you will find in each a little waxy-looking stamen, or pollen-mass. These pollen masses have the appearances represented—5. Al-

Fig. 134.

lowing for variations, the above will afford you some idea of the orchideous structure. You can scarce fail to recognise an orchis, after having examined attentively one or two of the family, and scarcely will your eye pass many of them over in your botanical walks, for they are generally handsome and conspicuous. Now, one of them at least will tell you its whereabouts by another sense than that of sight—that of smell. The white butterfly orchis, or *Habenaria bifolia*, is extremely fragrant, and also the smaller white *Habenaria albida*. Both are moorland wildlings; many of our handsomest orchis flowers, however, are found in meadows, pastures, and on chalk soils; others are found in woods.

In our woodland walks this month, we encounter many plants which also ornament our gardens. Monkshood is apt to stray from bounds and to make itself at home, and the same may be said of the *aquilegia*, or columbine—

"With horn of honey."

The honeysuckles, or, as they are called botanically, *Loniceras*, are at home everywhere; so is the privet. Less common, the wayfaring-tree, or guelder rose, may occasionally be met with, especially the commoner species, or *Viburnum opulus*, which now shows its cymes of white blossoms, and later in the year its bright red-purple berries, which vie in colour in the hedgerows of mid and southern England with those of the *Tamus communis*, or black bryony, also in flower this month, and throwing its trailing stems, and bright green heart-shaped leaves, high up among

the hedgerow shrubs. It is a handsome climber. We may find in its company, in the south, the clematis, or traveller's joy. In the wood betony, we recognise another labiated friend, its flowers bearing an evident resemblance to those of the red nettle. The length of stem between its leaves is a feature of the plant that will give you some guide in making it out. Before we leave the wood, gather the plant with the somewhat heart-shaped leaves, the small pinkish flowers, and creeping root; it is the *Circæa*, or enchanter's night-shade, and grows in shady damp places, as these witching plants are said to do. And now we may take our turn to the lake and the stream, collecting, if we can find it, on the margin of the former, the *Hippuris*, or mare's-tail. You may know it by its erect jointed stem, from one to two feet high, and its whorled linear leaves eight or ten together. But you must not expect the blossom to attract your eye; for one little stamen, and one little style at the base of each upper leaf, is all it has to boast of in this way. It is one of the three British representatives of the first class and order (*Monandria Monogynia*) of the Linnæan arrangement of plants. In similar situations to the mare's-tail, we may find one or other of the water mill-foils, with their numerous fine leaves, and slender spikes bearing barren and fertile blossoms, that is the stamen and pistils, separately.

The bladderworts are another genus of our June flowering water-plants, and not the least curious, being distinguished by the presence "on their roots, stems, and even leaves, of numerous membranaceous reticulated vesicles, which are said to be filled with

water, till it is necessary the plant should rise to the surface and expand its blossoms above that fluid. The vesicles are then found to contain only air, by aid of which the plant floats! This air again in autumn gives place to water, and the plant descends to ripen the seeds at the bottom." It has been observed that the bladders of *Utricularia vulgaris*—common bladderwort—"have an orifice closed by an elastic valve, opening inwards, and of much thinner texture than the bladder to which it is attached. Aquatic insects often enter these bladders, and are of course imprisoned."* Many of the pond-weeds, or *Potamogetons*, blossom in June; but their comparatively dull exterior, and somewhat difficult characters, will scarcely attract the attention of young botanists, who have so many of the gayer summer beauties awaiting them. All know the floating brown-looking leaves of the pond-weed, which almost choke up our streams in summer. Of their associates the sedges, or carices—genus *Carex*—we will speak next month in connexion with the grasses. We may well leave the sad-coloured pond-weeds to gather the golden iris flower, the yellow water iris, though we must almost certainly get wet feet in the doing it, for it generally gets deep in its, we might call it, "native element." A handsome flower it is. Turn up the arched yellow petal-like coverings which form the pistils, and you will discover the stamens underneath. Get as much of the plant as you can, but you will scarce persuade your herbarium paper to hold its great creeping root. If

* Hooker's Brit. Flora.

our stream should be an English brook, and not a Scottish burn, we may chance to add to our collection the large pale-purple corollas of the water violet, or *Hottonia palustris*, which, leaving the plant leaves beneath the water, rise conspicuously whorled around their solitary stem. Do not let the name mislead you; these blossoms resemble neither in scent nor in form those of the violet, albeit they have a beauty of their own. But if our step out of the water is to the shore of a highland loch, we can scarce fail to plant our foot on the green, turf-like patches of the shore-weed (*Littorella*), its linear fleshy leaves, and fertile or pistil-bearing flowers, nestling and blossoming in the axils formed by the former, with the stems or "scapes" which support the stamens or barren flowers two inches higher in the world.

Our next marsh friend claims kindred with the roses, through the family of the *Potentillas;* indeed, it might be mistaken for one of the latter family. It is the marsh cinquefoil, or *Comarum palustre*, and bears on its upright, branched stem flowers of a dingy purple, resembling in shape those of the strawberry. In the same marshy situations as the last plant, we meet with another rosaceous connexion, the water avens, or *Geum rivale;* growing a little better than a foot high, with drooping blossoms of a dull orange colour, you will almost surely recognise the plant.

One more marsh friend, almost the prettiest of all, and we return to dry ground. Look low down, almost among the moss, for the sweet little pink corollas of the bog pimpernel (*Anagallis tenella*)—the name almost speaks of elegance—and if you have

the good fortune to find them, watch, before you gather, how prettily its slender stems and small ovate leaves rest upon their mossy bed—not less prettily will the plants rest on the paper of your herbarium, if you preserve it well, and it is worth preserving. You cannot fail, either, to mark the family likeness to the larger and better known scarlet pimpernel of our corn-fields, which is said, by closing its brilliant blossoms, to give timely notice of summer rain. How shall we enumerate all the

> "Bright gems of earth in which perchance we see,
> What Eden was, what Paradise may be,"

that yet await our June wanderings? Here are the grasses in scores, but these we leave till next month.

The wild roses crowd the hedges, but all know the roses, and their different species we dare not enter upon; neither upon the brambles; all we can say is, gather them, dry them, and have them named as well as possible; but they are often puzzling, even to the discrimination of the practised botanist. The potentillas are near connexions of both, and belong to the family of the Rosaceæ. The creeping *Potentilla reptans*, with its yellow flowers, long creeping stems, and palmated leaves, and the *Potentilla anserina*—silverweed, or cinquefoil—are the species now most commonly met with in blossom. The latter has yellow flowers also; its much-divided pinnate leaves are remarkable for their silvery gloss on the under-side. Sharing the hedges with the roses, and supporting its long weak stems, rough palm-shaped leaves, and white green veined flowers, by means of its spiral tendrils, we find the bryony (*Bryonia dioica*), the only British plant which belongs to the

gourd tribe. It scarcely occurs in Scotland. Stop one moment from the pursuit of more showy flowers, to examine the plantains (*Plantago*). All know the plants: one species at least (*Plantago major*) they gather for their pet birds, when its long-spiked heads are in seed. Let us take the equally common ribwort plantain, of which the black cylindrical heads are now conspicuous everywhere, hanging out from each little floret of which the head is composed, four long stamens—Fig. 135. Examine the plant closely, and you will find it prettier in detail than it appears in mass. Each little floret—Fig. 135, 1—is very perfect in itself; and if you open one up which is not fully expanded—3—you will find the long filaments—2—of the stamens curiously doubled up in the packing, as represented. Our handsomest plantain (*Plantago media*) is conspicuous from its long silvery pink-looking spikes. In some countries the presence of the plantains in pastures is thought to give richness to the milk of the cows. We must not overlook the yellow rattle (*Rhinanthus crista galli*), for ere long its seeds will be rattling in its quickly-ripened seed-vessel. Its compressed, dark yellow, beaked corolla, and the purple spotting of its smooth stem, will introduce it to you.

Fig. 135.

The meadow rue (*Thalictrum*), and the pheasant's

eye (*Adonis*), the one with its yellow, the other with its bright scarlet flowers, again remind us of *Ranunculaceæ;* and on waste ground, especially if newly turned up, as on railway embankments, we have, with their flowers of mingled red and black, the *Fumitories*, of which, do what you will, you will find it difficult to make neat specimens, their cut and doubly-cut leaves are so inextricably confused together. Cruciferous friends meet us in the form of charlocks, wild mustard, &c.; and we now find the different species of *Euphorbia*, or spurges, with their acrid milky juice famed as a wart remedy. You must look for their stamens and pistils separate. Under the hedge-sides, the scarlet *Lychnis diurna*, and the white *Lychnis vespertina* so fragrant in the evening, are commonly found, and twining above them, probably, one or both of the bindweeds, better known as convolvulus, whether the small pink or the large handsome white. Nearly allied to the *Lychnis*, the *Silene inflata*, or bladder campion, is to be recognised by its blown-up calyx; which, however, is also found in the *Silene maritima*. Neither must we forget the various geraniums, or crane's-bills, alluded to more in detail last month; nor our old friends the composite flowers, represented by the handsome purple goatsbeard, or by the numerous genus of *Hieraceum*, or hawkweed, which so many mistake for dandelion.

But here we must stop. Many a bright wild flower of "blessed form and dye" are we forced to leave unnoticed, in this month of floral abundance; but that is no reason why our readers should leave them to "blush unseen." Nay, let them find them for themselves; we must not tell them all, but let somewhat remain for expectation.

JULY

JULY.

"The spirit of beauty unfurls her light,
And wheels her course in a joyous flight;
I know her track through the balmy air,
By the blossoms that cluster and whiten there,
* * * * *
Still wheeling her flight through the gladsome air,
The spirit of beauty is everywhere."—DAWES.

"ON field, and hill, and river," in wood and glen, on moss and moorland, rests the "Spirit of Beauty," for the flowers of July are blossoming in their abundance. Nor must we forget the sea-shore, for there too may we find flowers. We begin with the well-known thrift, or sea-pink (*Armeria maritima*), so commonly used in some places instead of box as an edging for flower-plots. Here it meets us on the sandy downs, but its pink heads of flowers also ornament the rock crevices quite down to the shore. The allied family of sea lavenders, or *Statice*, is less widely distributed than the former, but its members are found in some special localities. In some of these rock crevices, mayhap, too, especially on southern shores, we meet with one of our umbelliferous friends, better known perhaps to many of our readers as it appears in the pickle bottle; we allude to the rock samphire (*Crithmum maritimum*). Its aromatic, pale green, fleshy, cylindrical leaves, and umbelliferous character, sufficiently mark it. Another sea-shore umbelbearer, like the last, better known on the table than in its natural condition, is the *Apium graveolens*, or wild celery. It is found chiefly in places rendered marshy by the salt water. We must not, however, lead our flower-gatherers to

expect an extempore salad with their midday lunch. In its wild condition the celery is very strong-tasted, and requires the ameliorating influences of cultivation to render it fit for food. You will scarce perhaps give the next plant, with its compact heads of beautiful blue flowers, and its prickly leaves, credit as an umbelliferous member; but it is one, nevertheless, and a pretty one too, growing quite down amid the sand. It is the sea holly, or *Eryngium*. Do not, however, take the matter for granted; but, if you have the good fortune to find the plant, examine for yourself. Observe, further, a characteristic of the stiff leaves: they are covered with a sort of bluish or sea-green bloom, being what is called glaucous. This character is very common in plants growing near the sea, though not confined to them. You will find it, too, very strongly marked in the case of the yellow-horned poppy (*Glaucium luteum*), a far from unhandsome ornament to our sea-shores, which it makes gay where it grows, with its very handsome yellow blossoms. It cannot escape either notice or recognition, especially when its curved pods, more than half a foot long, are developed. Another sea-shore plant, which exhibits this glaucous character, is the *Cakile maritima*, or sea-rocket, one of the cruciferous order with pretty pinkish white flowers, and almost bushy in its growth. Its frequent companion, with tufts of smooth kidney-shaped leaves, white flowers, and globe-shaped seed-vessels, is also cruciferous, and possesses the dietetic and partly medicinal properties of the order, whence it is named the scurvy grass, or *Cochlearia maritima*, being a near relative of our well-known horse-radish.

The scurvy grass does not present the glaucous character, but our next friend derives its name from it. The *Glaux maritima* is common on almost every shore, and is conspicuous for its rose-coloured flowers, resting in the axils which its ovate, fleshy, opposite leaves form with its branched and procumbent stem. It is pretty while growing; but, like most fleshy-leaved plants, loses much of its beauty in the drying. Salt marshes never look very inviting for exploration, and are almost necessarily connected with wet feet; but we must search the first we come to, for the much-branched but leafless glasswort (*Salicornia herbacea*), with its curious jointed, cylindrical stems, which look candied like a sweetmeat with saline incrustations. A somewhat similar plant, the saltwort (*Salsoli kali*), we may find growing on most sandy shores. These, and sea-shore plants generally, are remarkable for containing a considerable amount of soda in their composition. Along with the above, some of the various species of *Atriplex* or sea-purslane are not uncommon, many of them noticeable for the sort of mealy bloom which covers their leaves, and gives them a hoary, frosted look. A species of plantain, too (*Plantago maritima*), delights in the grassy margins of the coast, its leaves linear and grass-like. Not unfrequently is it accompanied by a relative, the buck's-horn plantain, or *Plantago coronopus*, which derives its name from the peculiar cutting of the leaves. Amid our sea-shore plants, however, the grasses are neither the least interesting, nor perhaps the least useful. One, especially, the sea-reed, or *Ammophila arundinacea*, deserves our attention for the eminent

service it performs on low sea-margins, such as those of Holland, where its roots matting together in the sand, form a powerful obstacle to the inroads of the ocean. We shall surely find its large, thickly-set heads, without going far, and probably in its company, its assistant in the work of sea-resistance—the *Triticum junceum*, or sea-wheat grass, with its spikelets thinly set on its zigzag stems. Both grasses have the glaucous hue already alluded to. Other sea-side grasses might we point out, but space would fail, and we rather pass on to a review of the general characters of this numerous and important family, whose members this month are in their full perfection. Vain would it be to strive after more than a general sketch of the grasses; their distinctive marks are, for the most part, so minute, that it would not be possible here to give a reader any clue to the names of those he gathers; nevertheless, such of our readers as desire really to have a good and useful knowledge of plants, ought to gather the grasses, and to preserve them, which, by the way, is a very easy matter. They make pretty specimens, and moreover admit of being examined at any time, even when dry; so that if our inexperienced friends are for the present too much occupied with the more attractive, fleeting, and easily-comprehended flowers, usually so called, they may well leave the grasses for the winter fireside. But though we thus, in a measure, exclude the grasses from the ranks of gay flowers, they are nevertheless perfect flowers with calyx and corolla pieces—or at least with parts answering thereto—stamens and pistils. We need not, this month, go far for a specimen in full bloom;

at all events, figures 136 and 137 furnish us with the requisite examples for the present, and will be a guide to the examination and comprehension of the real plants. The flowers of grasses are usually arranged in spikelets, such as we see in wheat, or as represented Fig. 136, these spikelets being either closely fixed to a central stem or rachis, as in wheat, or loosely hung or panicled, as in the case of the oat. Each spikelet is generally inclosed within two scales or glumes, which form its common involucre; the florets which compose the spikelet being, whether few or many, generally made up each of two unequal scales, or palæ—2—within which are inclosed the stamens—4, 4—and the styles—3, 3—which spring from the seeds or grain. The stamens, usually three in number, are very loosely attached, being what is called versatile, and hang conspicuously out of the florets accompanied by the two feathery styles, at the base of which is situated the seed-vessel or grain. Many of the glumes and palæ of the grass flowers are marked by nervings or ribs. These furnish distinctive characters, which are further derived from the termination, &c. &c. of the flower-scales. Thus in Fig. 137, 2, the inner palea is seen to be toothed or bifid; in Fig. 136, the corresponding

Fig. 136.

Fig. 137.

scale is not so. Again, in Fig. 136 prolongations or *awns* are seen to proceed from the backs of the outer or larger paleæ, albeit sometimes these appendages arise from the extremities of the scales. Before closing our examination of the grasses, we may further remark their cylindrical, hollow, fistulous stems, with joints or diaphragms, and their straight-veined leaves, slit down the sheath by which they are attached to the central stem. The examination of such comparatively plain vegetable productions as the grasses may not at first seem to possess much interest, but it will be found far otherwise if entered into; indeed, many botanists will pass by the gay flower for the grass. Perhaps, however, we have said too much in depreciation of the grass family. It is true we do not find bright and varied colours, but we do find among them most elegant forms. What can be more graceful than the droop of the oat, or of the brome grasses, or of the wood melicas? What prettier than the silky lustre of some of the smaller *Avenas*, or oat-grasses? What more slenderly delicate than the *Airas*, or hair-grasses? Nay, we might ask, what more stately than the common reed (*Phragmites communis*), which ornaments our waters with its stems or culms from six to eight feet in height, crowned by its gracefully-drooping, many-flowered, purple panicle? Enough—we have vindicated the grasses from the charge of being a plain, if they are not a brilliant family. We will not, we must not enter into their individual merits, but, having recommended them to notice in this their month of perfection,* pass on to their equally interesting if

* Although the grasses are chiefly noticed this month, it must be remembered that some flower in May and many in June.

less useful relatives, the sedges—*carices*—of the genus *Carex*—Fig. 138. The sedges, although bearing a general superficial resemblance to the grasses, will, on examination, be found essentially different: instead of their stamens and pistils being found together, they are separated, either on the same spike, or, as in the species figured, on separate spikes. In this case the spike of barren or stamen-bearing flowers—

Fig. 138.

1—is single, and terminal; and there are three fertile, or pistil and seed-bearing spikes—2. Neither are there, as in the grasses, two opposing glumes or flower-scales, but only one, which incloses either the two or three stamens, or the seed. Moreover, the stems of the sedges are not, like those of the grasses, cylin-

drical, but are acutely angular: the leaves too are generally angular, and are not slit where they embrace the stem. Few families of plants are more puzzling and difficult to the young botanist than the sedges; but still we say, collect and preserve specimens when and how you can, and the time will probably come when you will become interested even in the difficulty of discrimination; and if it does not, you will possess specimens of a highly characteristic family of the monocotyledonous division of the vegetable kingdom. Generally, the sedges are the denizens of moist places; but some are found in pastures and on hill-sides, and one is a sea-shore plant, serving, like some of the grasses, to bind together the shifting sand. Many carices are serviceable to man, but they are much less important in this respect than the food-bearing gramineæ. The sedges belong to an order, the *Cyperaceæ*, which includes a variety of other similar plants, chiefly of the rush kind; there are the club or bull-rushes, the spike, and the mud-rush, and others, which in our rambles we are sure to meet with; suffice it to say, that these are all included under the division *Glumosæ*: in other words, their flowers—if we may call them so—consist each of a single glume or scale. Neither must we confound the *cyperous* rushes with the rush or juncus proper, that is, with the rush and its brethren, from which we make the rush caps of school boy days. These and their woodland relatives, the *Luzulas* or hairy wood-rushes will, if examined, be

Fig. 139.

found to carry much more perfect-looking flowers than the others—Fig. 139. We fear, however, that we shall not persuade many in their first botanical rambles to turn away from the bright-petaled flowers that now, for the first time, meet their awakened sight during

"The long sunny lapse of a summer day's light,"

and take up with the sober rushes. Nevertheless, we cannot let them go from the stream and the marsh, even with the excuse of wet feet, till we have got through some more introductions. Here, then, is another rush; but it is one whose handsome form will atone for past dulness, for it is the flowering-rush, or *Butomus umbellatus*, carrying an umbel of many bright-coloured red flowers on the summit of a tall, tapering, cylindrical stem: handsome it looks in the water, for it is generally tolerably off shore, but it will tempt the most prudent to risk a damp shoe. Rivalling in height this queen of the rushes, we have the *Typha latifolia*, or cat's-tail, sending its cylindrical dark-coloured spike or *spadix* three or four feet above the water. Forming, as it were, an underwood to these tall water-plants, the branched bur-reed always attracts attention; its sword-shaped leaves, and the spherical heads of what are its flowers, with the branching of the stems, are different from all the same class of plants around. Truly our water-plants are not of the Peace Society, for after the sword-leaves of the bur-reed or *Sparganium*, we encounter in some places the water-soldier, or *Stratiotes*, showing its white flowers guarded by its edged leaves and stems; and, probably, not far off are the beautifully-

shaped arrow or spear-head leaves of the arrow-head, or *Saggitaria*. The plant has also white flowers, but the shape of the leaves at once tells, and almost suggests, its name. More common than the last plants, for they are not found in Scotland, the water-plantain, or *Alisma plantago*, is of frequent occurrence in our ponds and ditches: you may know it by its broad leaves rising on long stalks from the root, and by the three pale rose-coloured petals of its blossoms borne on the many-branched stem. In America this plant is employed as an antidote to the bite of the rattlesnake. Wash all the roots well, and we may go, having been long enough in these moist places, even for July. Moreover, we have plenty of work before us. Last month we only glanced at the roses, and left them—as other beauties are sometimes apt to be left—because we scarce could manage them, and this time we must do the same with their relatives the brambles—genus *Rubus*. The brambles are rosaceous plants, and many of them the inexperienced botanist will in vain endeavour to make out: some, however, are well marked. None can mistake the *Rubus idæus*, common raspberry, especially when in fruit, and few will pass it on a hot summer day when its berries are ripe: moreover, they have, though small, a flavour superior to those of the cultivated plant. The raspberry is found wild, very commonly in Scotland, but less so south of the Tweed. It delights in the northern woods, or in the stony margins of mountain torrents: when in blossom and dried, it makes a very pretty specimen. By the stony margins of some of the Scottish lochs the wild raspberry is found in great perfection. It

used to grow profusely, and may do so still, by the bank

"of sweet St. Mary's,"

in Selkirkshire, a lovely sheet of water, which lies embosomed amid the pastoral hills of what are sometimes called the Southern Highlands, and which used to be a favourite haunt of Scott and of Wilson: and was of Eliot Warburton, just previous to his last and fatal voyage. Not that we would connect the presence of the poets and authors with the fact of the raspberries, but yet we would answer for it that none of them would pass by the tempting fruit without stopping to gather; though, we fear, not for botanical contemplation. Somehow the bramble genus has not been a favourite with the poets; one only that we can remember—Ebenezer Elliot, the "Corn-law Rhymer"—has specially addressed the "wild bramble of the brake," with, as he calls the blossom, its "small white rose." Brambles and prickles are usually associated, but there is a little Alpine native, which, in autumn, offers its large well-flavoured orange-red berry, without a thorn, and which this month ornaments the damp patches of some of the northern moorlands with its large white flowers, each little plant, about eight inches high, bearing but one flower and one berry—it is the cloud-berry or queen's-berry: covering large patches of ground, it is a favourite cover for the muir-fowl, which find in it both food and shelter. Another mountain bramble, the *Rubus saxatilis*, flourishes, as its name implies, in stony places—it has creeping stems, and its flowers are small and inconspicuous. Having apparently got upon the hills, as it is no joke ascending them twice,

we may search for some more of their July blossoms. Happy should we be, if, in the north, we can find the plant namesake of the great botanist, the *Linnæa borealis*. We must give its picture—Fig. 140—for it is called after Linnæus, the father of botanical science, and its graceful and withal fragrant bells deserve an illustration. Scarcely less beautiful are our next mountain friends, the *Pyrolas*, or winter-greens, which send up their stems or scapes of white blossoms, drooping with the grace of those of the lily of the valley, which in some degree they resemble. Next come those funny little plants the sun-dews, or

140. The *Linnæa*, or *Linnæa borealis*, a northern plant of much beauty, named after the great Swedish botanist.

droseras, both round and long leaved, and covered with those red sticky glands which they use as fly, or rather midge traps, and with so much success, for they are always covered with the unfortunate insects: these plants grow in the bogs. On the dry rocky uplands we shall probably find the *Helianthemum vulgare*, or rock-rose, expanding its limp, yellow

petals to the sun, and near it a small leguminous plant, the *Anthyllis*, kidney vetch, or lady's fingers, bearing double heads of reddish, but, occasionally, white flowers.

A rapid glance through the woods—for the July flowers are conspicuous. We can scarce miss the yellow corollas of the *Melampyrum pratense*, or common cow-wheat, which spring from the axils of the opposite, narrow lance-shaped leaves. Nor can the true bells of the campanulas escape us, unless it be those of the very small and graceful ivy-leaved species, the *Campanula hederacea*, in the shade of the wood. These are mostly July flowers, and one, the best and most fondly known, our own "hare-bell," will ever connect the campanulas with this month in Sir Walter's concluding lines of the "Lay"—

> "but still,
> When Summer smiled on sweet Bow-hill,
> And July's eve, with balmy breath,
> Waved the *blue-bells** on Newark heath."

Almost sacrilege it is to pass from these to the *Alliums*, or garlics, to whose not unhandsome flowers the reader may find his way by other sense than sight. Scarcely more odorous, either, are the wound-worts—*Stachys*—with dark purple labiate flowers, noted, in bygone times, as the name denotes, for their power of stanching the flow of blood from wounds. Pluck the white flowers of the dog-wood tree, and let us back to the fields and meadows, for we shall not overtake half they have to offer us. Here are all the rough-leaved members of the borage

* The wild hyacinth is often called the blue-bell; but here we have the great authority that these are the real blue-bells.

family, and among them the stony-seeded *Lithospermums* or Gromwells, at least the commonest, with white flowers; stony seeded in truth, for its hard, flint-like seeds actually do contain a notable proportion of that silica which we noticed in the earlier pages of this volume as being the hardening principle of the cuticle of the grasses, horsetails, &c. The *Anchusa*, or alkanet, with its bright blue wheel-shaped corollas; the common bugloss, its blossoms less regular than that of the other species, but also bright blue, and contrasting strangely with the very rough or hispid leaves and stems of the plant which bears them. Add to these the borage itself, its corollas, from their size, making their azure hues most conspicuous.—Then again we have the *Cynoglossum officinale* or hound's-tongue, still bristly, but softer to the touch than any of the foregoing; smelling, too, disagreeably; its flowers of a lurid red. Nearly all these plants grow amid debris, and in waste places. To the same family belong our friends the forget-me-nots, already noticed: even a superficial comparison will show the resemblance. Members of the ranunculus family still cross our path, and the *Papaveraceæ*, or poppies, present us with the celandine or chelidonium, bearing small yellow flowers, which perhaps less attract attention than the beautifully shaped deep green leaves. You break a stem, and a gamboge yellow juice exudes. Long ere this some of the willow-herb, or *Epilobium* genus, must have attracted your attention. The handsomest, *Epilobium Angustifolium*, or rose-bay willow-herb, you may not have met with except in gardens, but the *E. hirsutum*, or great hairy species,

is so common and conspicuous in our ditches—it grows to the height of four or five feet—that its rose-coloured flowers could not be missed. Examine its four-cleft stigmas—the other species all bear smaller blossoms, but you will scarce fail to detect their resemblance to one another. If you are at a loss to find the great hairy willow-herb, some village child will show you it under the name of "cherry-pie." A no less conspicuous family—the St. John's worts—we notice next month, for we must now look into the cornfields ere the sickle clears the ground. Surely we find the upright stem and purple red flowers of the corn-cockle, or *Agrostema githago*, and no less certainly the brilliant blue composite heads of the blue-bottle, or *Centaurea Cyanus*, rivalling in bright colouring the golden yellow of the yellow ox-eye, corn marigold, or *Chrysanthemum segetum*. The centaurea belongs to a family of ancient repute for curative properties, and the name is derived from the fable which tells of the Centaur Chiron, healing the wound inflicted by Hercules by means of one of the plants of the tribe. Another pretty flower we may gather, the common flax or *Linum usitatissimum;* most know the graceful blue flowers of the lint "when in the bell." The lesser species *Linum catharticum*, or purging flax, common in most pasture ground, is a pretty slender plant, and before unfolding its little blossoms, droops them in most modest fashion. Geraniums, or crane-bills, which we have not seen before, but which we recognise from their relatives we do know, will probably be picked up, and trefoils too, also recognisable from their family resemblances. Among them the hare's-

foot trefoil, with its hairy looking heads, in which the little flowers are almost lost, and the strawberry headed, more conspicuous when in fruit. But here we must stop, hoping next month to make amends to some of our floral favourites for our apparent neglect of them in the long list for July.

AUGUST.

"Blessed be God for flowers;
For the bright, gentle, holy thoughts that breathe
From out their odorous beauty like a wreath
Of sunshine on life's hours."

One little plant we have almost let escape us amid the profusion of "buds and bells," one, the tiny blossoms of which well repay the attentive examiner —it is the little Euphrasia, or eyebright, better known for its *reputed* powers of giving cheerfulness to the mind and brightness and clear sight to the eyes than for its beauty. We must not miss it, for we would take it as an emblem of the effect which we trust these monthly papers may have had, and may yet have, upon the thoughts and eyes of some of our readers.—May we hope that weeds and wild flowers are now seen by them that never were seen before, and that, being seen, they are regarded with different eyes and feelings than heretofore, at least with greater interest. May we hope that to some the "pure sweet flowers of God" have breathed "bright, gentle, holy thoughts," that some have learned to say and feel, "Blessed be God for flowers!" and that, perchance, in some botanical

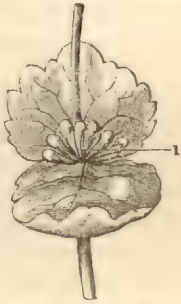
ramble, a few of "life's hours" have basked in a sunshine that otherwise they would have missed. If it has been so, our literary eyebright has greatly fulfilled its mission. But to the flower itself: it grows both on the lowland pasture and on the highland hill; moreover, the breezy uplands seem more favourable to its flourishing than the low grounds. In the latter, it is most frequently a small single-stemmed plant, rarely exceeding three or four inches in height; on the former, it rises often to eight inches, and throws out many branches, on which its purple-veined flowers are thickly placed. We must, then, mount the hills for fine specimens of our eyebright, and where so pleasant as the hills and moorland-heaths in August, for they are now in their full flush of beauty with the "blooming heather." The heather, or as it is called in England the ling, botanically *Calluna vulgaris*—gives its rich purple colour in the landscape: now and then, however, isolated plants bear white blossoms. This is likewise the case with the cross-leaved heath, or *Erica tetralix*, which you may know by its rose-coloured bells—much larger and more bell-like than the heather blossoms—and by its hoary or pubescent appearance; the latter character distinguishing it at once from the fine-leaved heath, or *Erica cinerea*, the blossoms of which are not very dissimilar. These heath flowers, as well as other plants common in the Highlands of Scotland, were adopted as the badges of the clans: thus the *Erica tetralix* was borne by the Macdonalds, the *Erica cinerea* by the Macalisters, the wild strawberry by the Frazers, &c. &c. Other and rarer heaths are occasionally met with, but scarce require

our notice here.* On these heath-grounds, you may gather a plant with rough linear leaves, and with heads of bright blue flowers which make it look wonderfully like one of our composite friends; this, however, it is not, as you will at once discern on examination, for it is claimed by the campanulas. Its name is the sheep's-bit or *Jasione;* we shall find another "bit" among the composites somewhat like it. Our next is not a campanula, though its four-cleft corolla is somewhat bell-shaped. It is the common field gentian—*Gentiana campestris*—a pretty plant with its numerous purplish blossoms. We have other gentians, earlier flowering, but they are comparatively rare. Not so their near connexion, the centaury, or *Erythræa centaurium,* which shows its handsome, bright-rose-pink corollas on most of our dry pastures. When we reach the sea-shore we may find some smaller species of erythræa, which so closely resemble the first named, in all except size, that it may well be doubted whether they do not claim from it direct descent. To find another of the gentian tribe, the yellow wort, or *Chlora perfoliata,* we must look southward. It is a pretty plant, and exemplifies well—Fig. 141—one remarkable form of leaf, the

141. Perfoliate leaves of yellow-wort. The stem pierces as it were the centre of a leaf; it is in reality surrounded by the junction of two leaves at their bases.

* It should be remembered that previous to putting the heaths in the drying press, they ought to be plunged for a moment into hot water, otherwise their leaves are extremely apt to fall off in the herbarium.

perfoliate, which appears just as if the stem passed through a hole in one leaf, whereas it is a pair of opposite leaves, perfectly united at their bases, which surround the stem. This form of leaf, be it remarked, differs essentially from the amplexicaul leaf—Fig. 142—in which, as will be seen, the junction is not nearly so complete. The example given—Fig. 142—is the *Lamium amplexicaule*, or henbit, or dead-nettle, in which the opposite leaves closely embrace the stem, and enclose a whorl of florets—1. At Fig. 143, we have another example of a leaf or leaves closely attached to the stem. These are the leaves of the common teazel—*Dipsacus sylvestris*—in botanical



142. Amplexicaul leaves of a species of dead-nettle, surrounding the stem and inclosing a whorl of florets.

Fig. 143.

language they are called connate leaves. Their union is so complete that they form around the stem a kind of cup, which you may often find partly filled with water. Indeed, the plant derives its botanical appellation from that circumstance; the

name *dipsacus* being derived from the Greek, signifying thirst. The common teazel is not an uncommon hedge-side plant in England, and you will at once distinguish it by the form of the leaves alone. We cannot, however, afford time to go up the hill twice, so we may leave the teazel and its lowland companions for a season, and return to the high grounds, where one of the handsomest of our moss plants, the *Parnassia palustris*, or grass of Parnassus, awaits the gathering, its large, handsome, white corollas glancing brightly, and in beautiful contrast with the dark moss amid which they blossom, and from which they are elevated about ten or twelve inches by the straight upright stem, which rises from the midst of the long-stalked, heart-shaped leaves by which it is surrounded. Beautiful at a distance, no less so is the *Parnassia* on close examination; the shape of the cup formed by its white petals is elegant, and at the base of each of these petals lies a fringed nectary, which gives the plant a most beautiful appearance. From the situation of its place of growth —the hill mosses—the *Parnassia* is unknown to the majority of people; few can fail to be struck with its beauty at first sight, or to assign it a place amid the ranks of the fairest of our native Flora. The grass of Parnassus is more common in the north than it is in England. Fair as it is, however, it must yield the palm to one still more beautiful, the white water-lily, or *Nymphæa alba*, that loveliest denizen of our lakes, which, in August,

> "To the light
> Its chalice rears of silver bright."

Poets have delighted in "the beautiful" associated

with these flowers, for nothing can be more beautiful than lake or loch gemmed with them, as

> "Stilly and lightly their vases rest
> On the quivering sleep of the water's breast."

Admire them while you can; for, alas! when dried for the herbarium, their beauty is gone, and with all your skill, you will make little more of the dried flower than a mass of brown petals. Neither will you be more successful with the less beautiful sister flower, the yellow water-lily, or *Nuphar lutea*, which you cannot fail to meet with. However, you must do the best you can for good specimens, and with each flower select one of the broad floating leaves, of dimensions suited to your paper. This, in the case of our own water-lilies, you may do; but a hopeless task it must be for the botanist in the instance of their gigantic royal cousin of South America, the Victoria Regia; a lily truly, but with blossoms measuring half a yard, and leaves six feet across. We were upon the hills, nor required we to descend for our water-lilies; for though they ornament the still waters of rich lowland pastures, they enliven, too, the dark surface of the mountain tarns. Nevertheless we must descend, for time advances; but still keep to the water-side. These blue, somewhat downy-looking, labiate, solitary corollas, which spring opposite each other from the axils of the leaves, belong to the *Scutellaria*, or common skull-cap, a familiar plant by river-sides, especially in England. A rarer species, with pinkish flowers, is also found. The former, which is the larger of the two, rarely attains a foot in height. Here we have a strongly-marked plant, with its square, four-winged stems,

and its panicles of deep blackish-purple, irregular flowers. It is the water figwort, or *Scrophularia aquatica*. Growing to the height of three or four feet, it can scarcely escape your notice, and it is common. Still more so is the *Scrophularia nodosa*, or common figwort, a plant somewhat similar to the last, but smaller, with flowers more tinged with green, and with stems which, though square, are not winged like those of the former species. Both delight in somewhat moist situations. If they are not pretty, they are, certainly, in their way, handsome plants. They do not, however, stand comparison with this bright purple-red spike of flowers which rises so gaily by the side of the water; the bright blossoms are in thick-set whorls, six long stamens have they, and six shorter ones. By these you will know the *Lythrum salicaria*, or purple loose-strife, a truly ornamental plant. Very like little potato blossoms are the flowers of the *Solanum dulcamara*, or nightshade, or bitter-sweet, which we often meet with by river banks, or twining in the moist hedge; no wonder that they should be so like, for the potato itself is a solanum. The purple petals reflexed from the cone formed by the five conspicuous yellow anthers, and the heart-shaped leaves, sufficiently mark the plant. Neither can the shrubby white-flowered and black-berried *Solanum nigrum* be mistaken, if the form of the blossom be remembered. These nightshades must not be confounded with the true deadly nightshade, or *Atropa Belladonna*, a very different plant, bearing large, lurid-purple, but not unhandsome bell-shaped drooping flowers. The *Belladonna*, however, belongs to the family of the *Solanaceæ*, which

includes two other plants now to be found in blossom, the *Hyoscyamus niger*, or henbane, and the *Datura stramonium*. The former of these, the *Hyoscyamus*, like the *Belladonna*, seems partial to waste places near towns, and is often found about churchyards. Its flowers, of a dingy yellowish-white, are beautifully veined with dark purple, and its branched stem is closely invested with the soft leaves, covered with soft hairs, which give it a clammy feel. The plant exhales a heavy disagreeable odour.

The peculiar aspect of the plants just named, and of others of the Solanum family, procured for them the name of *Luridæ*, from Linnæus, who imagined their dark look indicated the narcotic acrid properties common to most of them. This peculiar appearance is even observable in the white-flowered datura or thorn-apple. This plant, which is often used—smoked like tobacco—as a remedy in asthma, grows not uncommonly in waste places. Its smooth, dark-green, rather large leaves, render it conspicuous, but it is still more so, when, in fruit, it displays its rather large seed-vessels covered with the spines or thorns from which it derives its familiar name. Here, among these waste heaps grows a plant, with finely-cut, deep green, and smooth leaves; the arrangement of its flowers proclaims it of the *Umbelliferæ;* and the linear, generally drooping involucre leaves, disposed on one side only of each umbel, distinguish it as the *Æthusa Cynapium*, or fool's parsley, a very common plant. Its small white petals have the inflected point alluded to, and illustrated, in a former paper. This month furnishes us with so large a number of umbel-bearing plants in blossom, that our students

may have abundant opportunity for comparing the differences, and remarking the peculiarities, as far as they can, of this numerous and important family. A considerable number of our August umbel-bearers are water-plants. The sium, or water-parsnips, are conspicuous and not uncommon; less frequently met with, we have the *Cicuta virosa*, or water hemlock, the latter like many of this family, extremely poisonous. Neither have the *Œnanthes*, or dropworts, another water-loving family, any great reputation for wholesomeness. One, the *Œnanthe crocata*, a large water plant, with its bundles of spindle-shaped tubers, somewhat like those of the dahlia, has in several instances proved fatal to individuals, who have eaten its roots in mistake for parsnips. Another species of *Œnanthe*, smaller than the last, is remarkable for its very hollow brittle stems. One of the prettiest of the August dry-land umbelliferæ, is the burnet saxifrage, or *Pimpinella saxifraga*, growing from ten to eighteen inches high, with its deeply cut leaves, chiefly springing from the root. The pepper saxifrage, or *Silaus pratensis*, umbelliferous notwithstanding its name, is distinguishable by its yellow flowers. The wild original of our common parsnip—*Pastinaca sativa*—is not uncommon as a weed in cornfields and pastures; still more frequently met with is the *Daucus carota*, or wild carrot. Do not expect, however, if you discern the plants,

144. Section of the fruit of the carrot. 1, The style—2, the fruit covering or pericarp—3, the seed—4, the albumen of the seed—5, the embryo or germ of the future plant.

that you are to find carrots or parsnips, properly so called, at their roots, these are only the developments of cultivation. The seeds of the wild carrot, however, have the peculiar aroma of the carrot seed generally, nor do they lack the bristly appendages—Fig. 144—which are so characteristic. However, the common caraway and the coriander, so well known as aromatic condiments and medicines, both retain the virtues of their seeds in the wild state. They belong to our umbel family, are not unfrequently found, especially in neighbourhoods where they have been cultivated, and are recognisable at least when in fruit. One more umbel-bearer, and we cease to try our reader's patience with this really troublesome and difficult family; we think that you will certainly make out the *Heracleum sphondylium*, by its great size and coarse exterior; its large umbels of flowers, which are sometimes tinged with pink, its flat-winged seed, or rather fruit,

Fig. 145.

and the inflated sheathes—Fig. 145—of its much-cut leaves. Cow-parsnip is its English name, and truly

it is strongly marked—perhaps as distinctly as any of our English members of the order.

On a dry pasture or bank, a ray of prettily-cut leaves, from the centre of which arises a slender scarcely drooped spike of yellow flowers, and we have the *Agrimonia Eupatoria*, or common agrimony —a common but pretty plant, which varies from one to two feet in height. A member of the *Rosaceæ*, it scarcely resembles others of the family we have met with. Neither will its relative, the *Poterium sanguisorba*, or salad-burnet, appear much more like them. Its pinnated leaves resemble in some degree those of the agrimony, and its heads of many flowers, of a dull purple, are conspicuous in pasture grounds at this season. It derives its English name of salad-burnet from its being used as a salad, and from the smell of its leaves much resembling that of cucumber.

We have not yet noticed any of our leguminous, or pod-bearing friends, but the bright-coloured yellow-flowered *Genista tinctoria*, or dyer's green-weed, or woad-waxen, looking almost like a dwarf plant of the yellow broom, bids us not forget them. On the moor ground, too, the *Genista Anglica*, or needle furze, seems to be a first cousin of our old acquaintance the common gorse or whin, which in truth it is. Its name bespeaks its thorny character. We find another thorn-bearer in the *Ononis arvenis*, or rest-harrow, a pretty plant withal, as it displays its rose-coloured and sometimes pale pink papilionaceous corollas, but smelling disagreeably. Not improbably, growing near the rest-harrow, you may, if you do not pass the plant over for a trefoil, which it

looks like when in flower, gather the black medick, or *Medicago lupulina*, its blossoms collected into little yellow heads. When these heads have developed their black, sickle-shaped pods, or legumes—which, by the way, may not quite answer your idea of a pod—you will be less likely to miss it. You may not meet with the yellow melilot, *Melilotus officinalis*, for it is comparatively rare; but perchance it may be gathered unwittingly by some young botanist, who, the first time he changes the drying paper, will incline to the idea that some "newly-tedded" hay has been substituted for his garnered flowers. The scent given out by the plant in question is exactly like that of very sweet new hay, and very powerful. The leaves of our common birdsfoot trefoil, or *Lotus corniculatus*, might rank it as a trefoil; but its well-known bright yellow flowers, which at this time of the year gild the dry pastures everywhere, are larger than those of any of our true trefoils, and are very differently arranged. A larger species, the *Lotus major*, which usually grows near water, bears a close resemblance to the last, but is a much stouter plant. In both these species, the umbellated heads of flowers are borne on very long footstalks.

In our Floral Directory, that most important and extensive family, the *Compositæ*, ought next to claim notice, especially as many of its individual members are now in full bloom; but as next month, alas! is

> "the season when the green delight
> Of leafy luxury begins to fade,
> And leaves are fading hourly on the sight,"

we shall find our list wofully curtailed, so shall we have more space to devote to the slighted ones now.

Vieing with the recently-noticed lesser lotus in the brilliancy of its golden yellow, and delighting in even drier soils, we find the *Sedum acre*, or yellow stonecrop, often called wall-pepper, a name which indicates, in the first place, its frequent habitat on the tops of old walls, and in the second, its acrid properties. Its thick fleshy leaves and bright yellow starry blossoms—which certainly appear before August—render it a familiar plant even to the most unobservant. Very tenacious is it of life, like the sedums generally, and if you consign to your drying-paper without first giving it a dip in boiling water, you will find it, the first time of changing, making itself quite at its ease between the sheets, and perhaps putting forth shoots of flowers. Another sedum—the *Sedum reflexum*—which grows to a much larger size than the last, you may probably meet with on some moss-grown wall or thatched building; and in the same situations, that very near connexion of the sedums, the house-leek or house-green (*Sempervivum tectorum*). If you do not know it, ask the first old woman you meet, and if there is a plant in the neighbourhood, she will tell you of it, for it is famed in the domestic pharmacopœia. Moreover, it is so difficult to kill, that it almost requires cooking before it is fit to dry, and then its thick, fleshy leaves, and really pretty flowers, cannot make a very handsome specimen. Another sedum (*Sedum Telephium*) with purple flowers, and which grows better than a foot in height, you will not pass by if you come near it, for it is conspicuous and grows in patches. The *Sedum Rhodiola* with thick fleshy root and yellow corollas you must go to the hills for; and for the

bonniest of the family, the little *Sedum villosum*, or hairy stonecrop, you must visit the sides of the hill-burns, or rills, as our English readers would call them. You will know it if you find a pretty little plant about four inches high, with reddish stem and fleshy leaves, covered with somewhat sticky viscid hairs, and bearing pretty rose-coloured blossoms.

We may not close our August chronicle without including the well-known St. John's worts—genus *Hypericum*—with their many stamens collected into separate sets or brotherhoods, giving us an example of the Linnæan class *Polyadelphia*. All know the yellow-flowered St. John's wort, with the curious black dottings on petals, and on calycine sepals, and often on the leaves. Few of our native genera constitute a handsomer brotherhood, none have a higher reputation in domestic surgery, and none, perhaps, ranked higher in the olden times as antidotes to all the witcheries and wizardries that found home in the imaginations of the people. Nay, the plants were even thought to protect against accidents from thunder and lightning. Truly our composite friends cannot complain if we have left them over till next month, for, with them, we have left a goodly company of our August flowers. We are loth to come down to the scant lists of Autumn, to realize the fact that—

> "The primrose to the grave is gone;
> The hawthorn flower is dead;
> The violet by the mossed grey stone
> Hath laid her weary head."

SEPTEMBER.

"The Autumn sheaves are on the hill,
And solemn are the woods and still,
With clustering fruits on every bough."

SEPTEMBER—Our last month of flowers! A month it may be of pleasant genial air, and of tempered sunshine, but a month which to the botanist and flower-seeker brings a shade of sadness. He feels, that however much of interest there may be left to him, the cheerful succession of bright blooming flowers is over for a season; at every step he misses some vanished form of beauty, and, truly to him, the words of the poetess,

"Ye are not miss'd fair flowers,"

apply not. He is conscious of many a blank, but ill-supplied by fruit and berry, by seed-vessel and seed; for, beautiful and interesting and useful as these are in themselves, their presence tells too surely of the summer passed away—foretels too plainly

"Of wailing winds, and naked woods,
And meadows brown and sere,"

which so shortly must take the place of the "summer's sheen," and of the autumn's "rosy triumph."

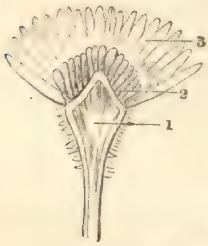
There are, perhaps, but few of our wild flowers which can truly be said to be September blossoms, but many which first opened their buds in August continue to blow through the present month. Some of these we have yet to notice; moreover, we shall find more than one little floret, overlooked during the profusion of its gayer companions, to be gleaned

SEPTEMBER & OCTOBER

after the summer's harvest. Last month we passed by a large section of our old familiar friends the *Compositæ*. Some, perhaps, may by this time have gone out of flower, but there still remain in bloom a sufficient number to excite the interest and exercise the patience of our less experienced readers, who must endeavour to call to mind what we have said in former papers respecting the floral structure of this important, but, to a tyro in botanical lore, somewhat difficult natural order.

We need not go far from town to gather a goodly number of Autumn flowering *Compositæ;* for many of them delight in waste places, rubbish heaps, &c. We at once get involved in a wild confusion of chamomile-looking plants, a confusion, too, which we fear any general description will do but little to unravel. As umbelliferous plants generally are classed by the ignorant under the name of hemlock, so are these as wild chamomile. The true chamomile, however, so well known in our herb gardens, and as a medicine, is comparatively seldom found wild. The flowers of all the species we are now alluding to have, like the daisy, a yellow disk, surrounded by a ray of white florets, and their stem-leaves are much cut and divided, with exception of those of the common feverfew, or *Matricaria Parthenium,* which, though much divided, are so in considerably broader segments. With flowers somewhat similar to the last, but with disk and ray both white, the greenwort, or *Achillæa ptarmica,* has acute lance-shaped leaves, sharply serrated, or saw-toothed at the edges. It is not an uncommon plant, but another species of the genus, the common

yarrow or milfoil, (*Achillæa millefolium*), is more frequent, indeed is common everywhere. Its clustered umbels, of many small composite heads of flowers, are usually white, but not unfrequently pink, and, under cultivation, often deep rose-colour. The plant derives its name milfoil from the much-divided leaves. It is a celebrated heal-all in domestic surgery. The above plants belong to the radiated or rayed subdivision of the *Compositæ;* in other words, their heads of flowers have a more or less distinct ray, formed by the ligulate or strap-shaped florets—Fig. 146—which are arranged around the circumference. To this subdivision also belong the daisy, the common ox-eye or horse-daisy, and the corn-marigold. It comprehends, too, the family of ragworts, or fleabanes, botanically ranged under the genus *Senecio,* and is represented familiarly to us all in the person of the common groundsel (*Senecio vulgaris*), albeit perhaps the plainest of its connexion. Its ray flowers are often absent, and when present, are certainly not conspicuous, but they are less obvious than they would otherwise be, in consequence of being rolled back, as you will find if you examine the plant. This is also the case in the *Senecio viscosus,* or stinking groundsel, which you may know by its family likeness, by its odour, and its covering of clammy sticky hairs, the latter character distinguishing it from another strong-scented relative, the *Senecio sylva-*



146. Section of Daisy—1, the disk —2, florets of disk—3, florets of ray.

ticus, or mountain groundsel. The common ragwort (*Senecio Jacobæa*) is so common a plant, and its corymbs of bright yellow flowers contrast so oddly with its really ragged shabby-looking leaves, that all must know it. With a far handsomer and larger flower, and with more appropriate-looking foliage, the *Senecio aquaticus*, or water ragwort, is by no means one of the plainest of Flora's autumnal train. The flea-banes (*Pulicaria*) noted for smoking off fleas, gnats, and "hoc genus omne;" the leopard's-banes (*Doronicum*)—handsome plants, but doubtful natives, flowering earlier in the year—the elecampane (*Inula helenium*) with its handsome solitary flowers, all belong to the rayed composites. The complete structure of these rayed flowers generally will be better understood by reference to Fig. 146, which represents a section of the familiar daisy-flower.* The receptacle—1—is conical, and supports the yellow florets of the disk—2—and the ligulate or strap-shaped florets of the ray—3; the whole head of florets, as pointed out in a former number, being enclosed in one common involucre. We cannot have a better opportunity than now, of exercising our readers' powers of observation, or of giving them a lesson in practical botany. Take up the dissecting needles and forceps, and the lens. You have cut your daisy-flower in two to compare with the figure. Now detach one of the yellow florets of the central disk. Look at it through the magnifying glass, you will find it a perfect little tubular corolla—Fig. 147—containing stamens—1—and style, with its

* In the papers for January and March, the reader will find reference to the more palpable characters of the composite flowers.

seed—2 (which is attached to the conical central receptacle) at its base. Again, in the same way, examine one of the white or crimson-tipped, strap-shaped florets of the ray—Fig. 148—you will find that it too has a little seed—2—attached to its base, but that it is only at the lower end it is tubular; moreover, that the little tube contains a style—1—only, but no stamens. All the florets of the daisy-flower being style-bearers, are capable of bearing seeds; but those of the ray having no stamens of their own—that is, being monœcious—are dependent for their fertilization upon the stamens which belong to the disk florets. Lastly, the florets and seeds of the daisy have no pappus or feathery appendage, such as we find in many of the rayed and of the other composites. From the above explanation, and from those given in January and March, and in Part II., the reader may derive a sufficient general idea of the flower construction of this most important family. He must, however, look for considerable diversity in detail, although the general characters remain the same. Thus, in the dandelion, the lettuce, the hawkweed, &c., which constitute the chicory-flowered section, the florets are all strap-shaped like those of the daisy-ray, and have both stamens and pistils, that is, are perfect flowers. In a third section of composites, which includes the

Fig. 147.

Fig. 148.

thistles, burdocks, &c., the florets are all tubular. The thistles (*Carduus*) and the plume-thistles (*Cnicus*) comprise some handsome species, and most of them flower late, that is, after July. The musk-thistle (*Carduus nutans*) is not one of the plainest, and you will not pass by its large handsome, purple, and withal drooping heads, with their prickly spreading involucre. Neither is the *Carduus Marianus*, or milk-thistle, with its handsome white-veined leaves, less conspicuous, but it is much less seldom met with. In a former page we took occasion to remark upon the frequent connexion of the popular names of plants with the honour paid to the Virgin Mary. The name "*Marianus*," was applied to this thistle, on account of the legend that the white veining of the leaves was imparted by her milk. The welted thistle, and the slender-flowered are both common. The plume-thistles—genus *Cnicus*—will scarcely be distinguished by our unscientific readers from the last, in general appearance, although the minute differences are well marked. The common thistle, which is the real Scotch thistle, is the *Cnicus lanceolatus*, and is abundant everywhere. The *Cnicus palustris*, or marsh plume-thistle, you may gather in most damp situations; and in similar situations northward, the *Cnicus heterophyllus*, or melancholy plume-thistle, its stems, and its leaves underneath, clothed with cottony down. The real cotton-thistle, (*Onopordum acanthium*), white with its woolly covering, is known to most, for it is cultivated for its handsome appearance, and is often called and grown as the Scotch thistle. The centaurys, including the bright blue corn-flower, &c., have been alluded to in

a former paper: they also belong to the thistle section, and with them the familiar burdock, the scales of its involucre being especially distinguished by those little hooked extremities which cling so tenaciously to the clothes. Last month we paid some attention to the form of leaves as attached to the stem; the thistles furnish us with an instance of what is called a decurrent leaf, or one the limb of which is continued down the stem, as represented—Fig. 149.

Fig. 149.

Of the chicory or lettuce-flowered *Composites*, sufficient incidental notices have already been given to render special reference to them unnecessary in this place. We must not, however, overlook the nominal chief of the sept, the *Cichorium intybus*, or chicory itself, which you may probably find in some stubble field, making the otherwise bare extent cheerful with its bright blue blossoms, and almost eclipsing some lowly little plants, which you will do well to look for now in the same situation. Here is one, procumbent, its branched stems, and stiff, sharp, whorled leaves lying near to the ground, and its pretty, though minute, crosier-shaped, lilac blossoms almost hid. It is the *Sherardia arvensis*, or field madder, named in honour of Sherard, a famous English botanist. Near it we almost surely find the dull-looking bartsia, with its red, irregular corollas, and conspicuous bracteas. It is a common and not

very attractive-looking plant, withering very quickly after being gathered. It has a much handsomer, but rarer relative, the yellow bartsia, found chiefly on the west side of our island. Doubtless, you have gathered ere this, for it is common in most pasture grounds, a plant somewhat resembling in form the creeping bugle of earlier months, but of greater slenderness, and without runners; its corollas, however, are much more purple, rarely white. It is the *Prunella vulgaris*, or self-heal; its dense heads of labiate flowers being enclosed by numerous broad bracteas. In a former paper, after describing the sheep's-bit, allusion was made to "another bit." Here we have it with its heads of blue flowers, alongside the prunella; you get it up and look at the root, but doubtfully, for you suspect a portion must be left in the earth, it ends so abruptly. It is all right, however; that root which seems to be "bitten" off is the natural appearance, and gives the name "*succisa*" to this scabious in botanical language, and in popular phraseology has given rise to the appellation "devil's bit scabious," the personage in question having the repute of being the biter. The plant, nevertheless, seems no way the worse. There is another but rarer species, the *Scabiosa columbaria;* and a third plant, formerly ranked as a scabious, but now known as the *Knautia arvensis*, in southern England as the Gipsy Rose, which you must have observed, for its rayed heads of many light-coloured lilac flowers have been conspicuous for some time. These last-mentioned plants look most suspiciously like composites, but they are not of the class, only near relatives, and claiming kindred with the conspicuous teazel tribe or

Dipsaceæ. The peculiar connate leaves of the teazels were alluded to last month. Their cone-shaped heads of flowers, prickly with the sharp scales which cover so thickly and *regularly* the cone-shaped receptacles, have a remarkable appearance. The light lilac-coloured corollas do not appear all over the flower-head at once, but come out, as it were, in successive bands. Less like a *composite* plant than the last, but yet one of the tribe, the common golden-rod (*Solidago virgaurea*) must not be passed over. You may meet with its straight stem clothed thickly with golden yellow blossoms, on some dry bank. The whole plant has a honey-like smell. Verily we shall never get clear of these yellow-flowered *Compositæ*, for here is the bitter aromatic tanzy (*Tanacetum vulgare*) awaiting our notice with its much cut pinnated leaves. Again, there are the woolly, aromatic bitter, but not yellow-flowered wormwoods, genus *Artemisia*, and the little silvery-looking cudweeds, or *Gnaphaliums*, bid us not forget them, though we cannot now stop to describe their white-looking flower-heads, and downy white leaves and stems. The sea-star-wort, or Michaelmas daisy, in its own special month we cannot pass over, even if its yellow disk and white or purple ray florets throw us now again upon the rayed *composites*, which we thought we were clear of. To find it, however, we must off to its home in the salt marshes, where it is not uncommon, hoping at the same time to find some late rose-pink blossoms of the *Convolvulus soldanella*, among the adjacent sands.

The sea-shore is pleasant in September, and we might linger, but we may not, if we would seize the

last opportunity of securing specimens of late blossoms that even now are fast passing away. Scarce can we hope to get specimens of the handsome *Lavatera arborea*, or tree-mallow, which ornaments a few of the "rocks of the ocean" around our coast, but we may hope for better success in our search in the salt marsh for the marsh-mallow, or *Althæa officinalis*, with flowers rose-coloured like those of the last-named species, but lighter and bluer in hue. The blossoms are handsome, and will attract your notice; but the entire plant, about two feet in height, is well marked by the thick covering of very soft down, or as it is called botanically, pubescence, with which it is clothed. Take your lens, and you will find the hairs stellate, that is, arranged in a star-like form. The genuine marsh-mallow is a medicinal plant, yielding abundance of starchy mucilage in hot water; but another species, the common mallow, or *Malva sylvestris*, is often used under the name of marsh-mallow. This plant, the "cheeses" of children, we may gather in most waste places; the dwarf mallow, with much smaller light-coloured pink flowers, is less common; somewhat rarer still, though perhaps not very uncommon, the handsome musk-mallow, or *Malva moschata*, bears its large handsome "wild rose" coloured corollas, at the top of its very erect stems and much-divided leaves. Examine the flower structure of any of the mallows, and you will find the numerous stamens all united into one tube which encloses the pistil. The staminal arrangement places the mallow tribe in the Linnæan class *Monadelphia*, of which it is an excellent example. In similar situations to the mallows, we ought, if we

have not found it previously, to meet with a late flowering specimen of the soapwort, or *Saponaria officinalis*, another pink-flowering plant, its blossoms somewhat like those of a lychnis, its opposite leaves marked with prominent veins, and at their base, approaching the connate form of the teazels. Belonging to the same family, the *Caryophyllaceæ*, the pretty maiden pink (*Dianthus deltoides*) shows its sweet little corollas even as late as this month, and may perchance be gathered by some of our readers; others of this handsome genus *Dianthus* are generally more rare. Much we fear that one of our best-known favourites, the odoriferous meadow-sweet (*Spiræa ulmaria*) will scarce forgive us a September notice, for it has been decking our meadows and moist banks since June came in. But all know the meadow-sweet, with its crowded cymes of cream-yellow, rosaceous flowers. Doubtless our readers have forestalled us, and gathered the plant, and perhaps its pretty relative the dropwort, (*Spiræa filipendula*). How is it, too, we have neglected this tall grower, which looks like a grenadier mignonette, and proclaims itself the dyer's rocket, or *Reseda luteola*, for it is a tolerably common, and not unhandsome plant. Taller still, handsomer too, and with yellow flowers, but very different from the last, the great mulleins, genus *Verbascum*, may speak for themselves; the commonest of the seven found in Britain, the *Verbascum thapsus* is well marked by its covering of long silky wool.

Of all the "buds and bells that with changes mark the hours" none speak more plainly, to the botanist, of Autumn, than the mints, perhaps the

most decidedly September plants—*Labiates* all of them—we have; and a numerous family they are, too numerous, and often too alike to be distinguished by general description; gather them, however, and make them out as you best can, with eyes and nose: for well do the mints, peppermint, spearmint, and pennyroyal, support the character of their order for odorous essential oils. Odorous, but disagreeably so, the black horehound (*Ballota nigra*) is another labiate, still flowering on waste spots near inhabited places, and, in similar situations the white horehound (*Marrubium vulgare*) may also be found; almost too well known is it to every old woman who prescribes for a cough, to require a description of its rather clumsy-looking stems, much-wrinkled leaves, and thickly-whorled whitish flowers. Very different in appearance, though another lipped flower, is the beautiful large hemp nettle, (*Galeopsis versicolor.*) If you found it among the growing corn, you would surely preserve it. Square-stemmed, jointed, upright, and distinct-looking, its handsome yellow corollas, with a large purple stain on the lower lip, stand boldly out. The smaller common hemp-nettle (*Galeopsis tetrahit*) is very abundant, and has much smaller pink or white flowers. The common marjoram (*Origanum vulgare*) has its labiate purple flowers in crowded rounded heads, and even now specimens may be found about the hill pastures; and on dry banks there is no doubt we may find the wood germander (*Teucrium Scorodonia*). Erect and stiff-looking, its yellowish flowers contrast with the purple anthers, and are borne on rather long, terminal, one-sided racemes. Its opposite leaves are strongly wrinkled.

There are other but rarer British species of the genus *Teucrium*. Irregular, like the *Labiates*, but with its corolla personate, or mask-like, the great snapdragon or frog's-mouth (*Antirrhinum majus*) is found generally in suspicious neighbourhood to some garden; and that pretty little creeper, the ivy-leaved toad-flax (*Linaria cymbalaria*) with a tiny corolla closely resembling the last in form, is equally open to the charge of straying from cultivated ground; of the genus *Linaria*, or toad-flax, the large yellow *Linaria vulgaris* is the most common, and must be familiar to all. The creeping toad-flax, somewhat similar in form, but with pale, bluish-veined flowers, is much rarer, and, indeed, like most of the other species, is not generally met with.

OCTOBER.

"Farewell! farewell! bright children of the sun,
Whose beauty rose around our path where'er
We wandered forth since vernal days begun,
The glory and the garland of the year.
Ye came the children of the spring's bright promise;
Ye crowned the summer in her path of light,
And now, when autumn's wealth is passing from us,
We gaze upon your parting bloom.—
* * * * *
Sweet flowers, adieu!"

Frances Browne.

Loth, indeed, are we to say to the flowers, "adieu!" so loth, that some few late blossoms have we kept for our readers, even to this tenth month of the year. They may have gathered them already, perhaps have made their intimate acquaintance; if so, the notice of a well-known form should not be the less welcome.

Here is one, a not unfrequent way-side plant. It has no gay blossom to recommend it; but possibly its large, deep green, and very triangular leaves, may have attracted attention to its spikes of green inconspicuous flowers. Our friend bears the honest name of Good King Henry, or mercury goose-foot; its botanical alias being *Chenopodium bonus Henricus*. The goose-foot or *Chenopodium* genus has already been alluded to, and mention made of the powdery meal-like substance which covers the leaves of some of its species. In the Good King Henry, this is absent, the leaves somewhat resembling those of spinach in appearance, and being at times used as a substitute for that vegetable. How came we so long to have passed by a plant which has been reminding us of its presence many a time in the course of our flower gathering—an unpleasant, but withal a useful plant—the common nettle (*Urtica dioica*), for it deserves some notice. Famed is it for dietetic and medicinal virtues, and nettle broth and nettle juice are well esteemed by the wise women of the country side; nor were the nettle fibres despised by the housewives of old, who made from them their coarser household napery, and dyed their yarn with the roots. But enough of economics. Gather a nettle—"grasp it like a man of mettle," and then it will not "sting you for your pains;" but the examination will repay you for them. Under the magnifying power of the lens, each little nettle flower, male or female, whichever it may be, is really pretty, and having examined these, you may transfer your attention to the numberless little stings which arm the whole surface of the plant. If the magnifying power

is sufficient, you will observe that each sting is a very sharp, almost elegantly-shaped polished spine—

Fig. 150.

Fig. 150—which is hollow, and arises from a swollen base. In this base, which is composed of small cells, is contained the venom; moreover, these cells are continuous with the hollow tubular sting; so that when, in consequence of pressure, the latter pierces the skin, the venom is at the same instant expressed. Its effect is too well known experimentally to require description: neither need we describe the plant. There are, however, two other species of nettle found in this country; one, the *Urtica pilulifera*, or Roman nettle, is the most venomous of the British species; it is not general, and even where found is a doubtful native: the other species, *Urtica urens*, or small nettle, is very widely distributed. It is smaller in every way than the large common nettle, and its leaves are much more deeply cut in comparison with their size. The nettles generally are by no means home plants, the common one at least extends its borders throughout Europe, and even reaches the far-off Japanese fingers.

These poisonous nettles have a harmless British relative in the common wall pellitory, (*Parietaria officinalis*)—a plant which attracts the eye, partly on account of its usual place of growth being the crevices of old walls and such-like places, where it finds its congenial nitrous nourishment, and partly from the reddish tinge which pervades it. It has been flowering since June; but even now its hairy,

red-looking stems may be found bearing its hair-clothed flowers, which are collected in the axils of its alternate, loosely-hung leaves. Despised as our native nettles may be, they have yet some most highly-prized and aristocratic relations abroad; among others, the fig and the mulberry, and many more we might enumerate did space permit. One British connexion, moreover, yields to none either as regards beautiful growth or useful properties. It is the common hop (*Humulus lupulus*), which we have not yet mentioned, though we doubt not some of our readers have already secured its elegant stems and leaves and flower catkins upon the paper of their dried collections. The catkins of the hop—Fig. 151—which are the parts collected for the sake of their well-known aromatic bitter, are the female blossoms.

Fig. 151.

Even the most nettly of the human species seem to have some friend or other, and our acquaintance the common nettle has one which seems peculiarly to delight in such society, for it chiefly shares its favours between it and the thistle. The plant is the parasitic dodder, a very curious but not uncommon vegetable production, which not only clings round, but grows *upon* its prickly supporters, by means of its very long, red, twine-like stems, and little bud-like attachments, repaying their protection with the ornament of its pale orange-coloured blossoms. If any of our readers have found the

plant—it flowers chiefly in September—they may have wondered at its strangeness; but once having seen a description, they cannot fail to recognise at least the dodders generally, from their mode of growth and parasitic situation. Of the other three species found in Britain, one which grows on flax, and another on clover, are doubtful natives; the third, the lesser dodder (*Cuscuta epithymum*) is the commonest of all, growing on gorse or whinbush, or heath, and, as its name *Epithymum* indicates, on the thyme. Lest some of our readers should not understand what is meant by a parasitic plant, we may explain that it is one which, instead of being fixed in the ground, and drawing sustenance from the soil, is fixed upon some other plant from which it derives nourishment. The most remarkable instance noticed in these papers is the well-known mistletoe; the dodders just alluded to furnish us with another example. The scaly toothwort noticed in April, is likewise parasitic, and nearly resembles another genus of similarly growing plants—the broom-rapes (*Orobanche*). These, however, as well as the toothwort, grow more generally upon the roots than upon the upper parts of the plants. The *Orobanches* are brown or purple-looking, scaly, leafless vegetables, more or less succulent. Although noticed thus late, they flower generally in August and September. They are most general on the roots of the pea-tribes, such as clover, broom, gorse, &c., but are also found on others. A queer-looking family are they, and so we dismiss them and turn to a more flower-looking friend, one that almost reminds us of spring, the pretty autumn crocus, or meadow saffron (*Colchicum*

autumnale). This is a real autumn plant, not generally common, and therefore not accessible to many of our readers; but its history is so interesting, so illustrative of the Divine care and wisdom, that it

Fig. 152.

Fig. 153.

well deserves a notice here. The pale purple meadow-saffron—Fig. 152—is just like a crocus in form, but its mode of growth is different. In September and October, the solid bulb which lies embedded in the earth sends up its unprotected blossom: no leaf has it to guard it from the winds of the equinox, or from the night frosts which tell us of coming winter. And how is this late blos-

somer to ripen its seeds without warmth and sunshine, and without—?—nay not without protection. True, the flower has risen and adorned the autumnal meadows, at this time so bare of other ornament, the anthers have ripened their pollen, the pollen has been shed upon the three-cleft stigma—Fig. 153, 3—and the seeds—Fig. 153, 5—have been thereby fertilized; but they ripen not this side of Christmas; they lie deep down in the earth, snugly covered up from the frost and snow, till the warmth of returning spring calls them forth; then are they and the seed-vessel which holds them, and their green straight-veined leaves withal, elevated from their winter sleep to meet the ripening sun-ray. Still we hear some reader exclaim, "All this is very pretty, but how is it?" Look at the adjoining woodcut—Fig. 153—which represents the section of our meadow-saffron flower as it appears in autumn. You see the petals—1—the stamens—2—the style—3. Trace that style down the long tube—4. Down, down it takes you far beneath the earth, the surface of which is marked at the point—*e;* at last it ends in the well-filled seed-cup—5—within the solid bulb. Through that long tube and style descend the fertilizing influences of the pollen of the autumn blossoms; the flower withers, and the baby-seeds, cradled in their well-protected cup, betake themselves to rest, till Winter's reign is over, till the glad time when

> "The bursting buds look up
> And greet the sunlight, while it lingers yet
> On the warm hill-side, and the violet
> Opens her azure cup
> Meekly, and countless wild flowers wake to fling
> Their earliest incense on the gales of spring;"

then come up, along with the gay corollas of Spring, the germs of Autumn, the buried seeds to be ripened, scattered, and in due time to furnish their blossoms, which deck the sober russet of the declining year with their purple broidery. Tell us, reader, know you a more striking illustration of the "tender mercies which are over all His works," than the history of the flowering and seeding of our little meadow-saffron?

Rambles not a few have we taken our readers, by moss and moor, by stream and lake, and in almost all have we encountered a tiny little plant, individually small enough, but conspicuous from its numbers, which extends in one surface of almost unbroken green over many a still water, which it protects from the heat of the sun, while it affords habitation to numberless insects. Moreover, insects, habitation and all, are apt to be gobbled up by the birds which skim the surface of the pools; hence, the plant itself has the name of duckweed (*Lemna*). The common duckweed which covers the pools must be familiar to all, a little oval floating leaflet, with one solitary root depending from it in the water, and increasing chiefly by means of buds, which take the place of flowers and seeds on the side of the tiny leaf or frond. These buds expanding into little fronds resembling the parent one, to which they still remain attached, likewise bud out, and so there is a succession of leaf after leaf growing from and still attached to each other, and forming one continuous sheet of green. Examine the little duckweed; it has no gay flower to offer you, but it is a curious little plant. Sometimes in place

of the buds you will find two little stamens and a tiny seed-vessel. The species of duckweed alluded to in these remarks—*Lemna minor*—is common on almost every pool; three other species are found in Britain, but are much less frequent.

And now "Farewell to Flowers," for

> "Autumn's latest gold
> Hangs on the woods, and Summer's latest bloom
> Is fading fast, as Winter, stern and cold,
> Comes from the northern home of clouds and gloom."

But not farewell to our readers, for we have somewhat to say to them of fruit as well as flowers, of bright berries, and of seed-vessels and seeds, that yet give interest to a botanical ramble even in November.

NOVEMBER.

> "The melancholy days are come, the saddest of the year,
> Of wailing winds, and naked woods, and meadows brown and sere.
> Heaped in the hollows of the grove the withered leaves lie dead:
> They rustle to the eddying gust and to the rabbits' tread."

> "Where are the flowers; the fair young flowers, that lately sprung and stood
> In brighter light and softer airs, a beauteous sisterhood?
> Alas! they all are in their graves! the gentle race of flowers
> Are lying in their lowly beds with the fair and good of ours.
> The rain is falling where they lie; but the cold November rain
> Calls not from out the gloomy earth the lovely ones again."

Truly, botanizing in November is cheerless work, if one looks for flowers; the "gentle race" have all passed away, and scarce a rain-beaten specimen of the never-failing daisy remains to us. Nevertheless, we are not yet disposed to say "farewell." After flowers, come fruits, and we may still pass a few profitable

NOVEMBER & DECEMBER

hours amid the banks and hedge-rows, examining the many-coloured berries and curiously-formed seed-vessels with which they now abound—albeit, we shall not limit our attention to November fruits, and seeds, and seed-cups only; but may indulge in retrospective glances at some of the more interesting forms of fruitage which have come and gone during the months of Summer, while we have been giving our eyes and thoughts solely to the gay blossoms. Autumn, doubtless, is the time of fruits; but all summer through, since the feathered seeds of the early colts-foot were wafted abroad by the breezes of May, has the flower-harvest been going on; blossom after blossom has appeared and bloomed and withered, and has been succeeded by its seeds, and these have been scattered over the earth by the means of dispersion appointed to each by the Creator of all. All this has been going on, and only now we notice it, not because these processes of seed formation and spreading are less interesting than those of the budding and blossoming of the bright-coloured corolla, but from the simple inability to compass all things in a limited space. Neither do we pretend here to give a detailed account of seeds or their nature, sufficient if we offer a guide to their examination and investigation in summers yet to come. Fain would we hope that our "Wild Flowers" have raised in some minds an interest that will not subside with the termination of *our year*, an interest that will look forward to the time of flowers, to the time when

> "Nature in Spring's best charms
> Shall rise revived from Winter's grave,
> Expand the bursting bud again,
> And bid the flower re-bloom."

However, that interest, if it be real and true, will seek to extend its acquaintance beyond the buds and bells which attracted its first botanical gaze, and the recognition of these as old and familiar acquaintances, will afford leisure for the enlargement of plant lore generally.

Here we may premise, that botanists do not use the term fruit in its simple conventional sense, but extend it in full meaning to the perfected seed apparatus generally. Do not therefore, we pray you, reader, let the word fruit conjure up in your mind ideas of the pulpy berry, or juice-filled flesh of pear or of peach, for many a dry little seed falls within the category of the botanist's "fruit." One thing, however, we will answer for—there is not a seed, be it ever so dry or apparently insignificant, that will not repay your attentive examination, especially if made with the aid of the magnifying lens. The outer covering of some kinds of seeds presents us with the most exquisitely carved markings upon its surface, exquisite in the beauty of its very minuteness. Some seeds, generally so called, are not actually seeds, but are a combination of seed and seed-vessel in one; of this nature are the seeds of our old friends the umbelliferous plants, such as caraway and dill; likewise the seeds of the ranunculus tribes, and also those of the composite flowers—Fig. 156.

Enough of technicalities. Let us choose some bright November day—and there are at times bright days in November—and let our walk be one of those hedge-row lanes which in summer are so green, and then so gay with the blossoms of the hawthorn, wild rose and honeysuckle, but which are now bright with

their brilliant coloured berries. There has been heavy dew in the morning, and from each red-jewel fruit depends a diamond-like drop of liquid, which sparkles in the sunlight—for remember, though it is November we have chosen a bright day. Surely, no array of blossoms ever looked handsomer or gayer than those fruit-decked branchlets, bare though they be;—almost do their jewel-like ornaments realize the fairy tale of Aladdin's gem-bearing trees, though the hips of the rose, the haws of the thorn, or the crimson fruit of the bryony or honeysuckle constitute all their wealth. To these will we return when we have examined this bright bunch of coral peeping out from amid the withered grass at the foot of the hedge. Ah! these coral-like berries are the result of the curious floral arrangement of our April friend, the arum, or wake-robin. The stamens, the spathe, and other parts have disappeared, and the little pistils have become *true berries*, containing their little seeds. Mark, we say *true berries*, that is pulpy fruit containing seeds—other fruits, such as the strawberry, which are often called berries by people generally, are not berries at all. This will be evident at once; for though few of our readers can have the advantage of a reference to November strawberries, all may remember that queen of fruits—Fig. 154—bears the little yellow seeds upon its surface; they therefore cannot be within its pulp. The fact is, these little seeds, "achenes" as they are called botanically, are

Fig. 154.

the botanist's true fruit of the strawberry, and the fleshy pulp is but an enlarged condition of what is called the receptacle of that and other flowers, being in fact the enlarged extremity of the branchlet on which the blossom or seed is situated. Fig. 155 represents a section of the strawberry blossom, with—1—the receptacle, on which the young seeds are as thickly set as possible; when that receptacle enlarges, they will become separated from each other, as at Fig. 154.

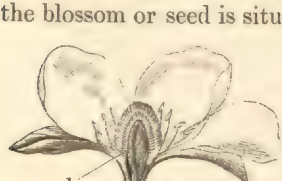


Fig. 155.

In others of the rosaceous class to which the strawberry belongs, the receptacle, instead of enlarging, remains dry and flat, as in the potentilla, consequently, the "achenes" remain crowded together when ripe. Almost we fear, some reader may trip over this little word achene, without explanation. Seed-vessels generally are called carpels, or seed-holders; the pod of the pea is one kind of carpel, the fleshy apple, the succulent pear, are both carpels, and so on. When, however, the carpel is dry, when it encloses a single seed, to which it is closely connected, as in the little strawberry seed, in the seed of the dandelion—Fig. 156—or the seed of the ranunculus —Fig. 157—it is further distinguished as an achene. Remember then, generally, seed-enclosing fruits are carpels, though carpels are of many kinds. Here then, still remaining thus late in the year, is a well-filled carpel, a true seed-holder, and filled to the brim with its brownish-black seeds, which appear almost as if held up to the birds to appease their winter

hunger. The vase-like capsule which contains them —Fig. 158—is not unhandsome in shape, as it opens

Fig. 156.

Fig. 157.

Fig. 158.

its teeth-like valves to disclose its treasured seeds, which claim parentage from the scarlet lychnis of May.. You have not forgot its handsome companion, the caltha, or marsh marigold, so like a large handsome buttercup; if we are near its place of growth, we may meet with another form of carpel, which it offers—Fig. 159—called a follicle, or little pocket; in this case a number of these seed follicles are together. However, we must get above the hedge bottom and look after some of the bright fruits we left when the coral-berries of the arum attracted our gaze. Let us take the rose hep—produced, like the strawberry, by a rosaceous plant, and yet how different the fruit. It, too, bears achenes, but, in place of being held up, as in the strawberry, on a projecting receptacle, they are buried within the tube of the calyx, as shown in the section of a rosebud—Fig. 160—or,

as it may be said, are fixed to an inverted or hollow receptacle. Then we have in the companion haw,

Fig. 159.

Fig. 160.

which is the produce of another rosaceous plant, the example of a *drupe* carpel, as all stone fruits, peaches, cherries, &c., are called. Scarcely will our reader be prepared to class with these drupe fruits the blackberries, which yet remain to vary, with their brilliant black, the brighter hedge colours, and yet every blackberry is a collection of little drupes, each containing its one little stone in the midst of its pulp—perhaps never before have you thought that strawberries and blackberries were not really berries, nor observed how they differed from one another in construction, and from the structure of true berries, such as currants and gooseberries. These hips and haws are the coral of our jewel-bearing branches, but the bright transparent *berries* of the honeysuckle are our red cornelians, and right handsome they look in their crowded clusters. Equally bright, but more loosely

congregated, we may find yet adhering to the withered trailing stems the fruit of the red-berried white bryony, competing in brilliancy with those of the *Tamus communis*, or black bryony, which we noticed when its glossy bright green leaves decked the hedge-rows in July. Then we have to gather bunches of the wax-like transparent fruit of the guelder rose; and, if the birds have left us any, of the graceful scarlet pomes of the mountain ash, the "Rowan berries" of Scotland. Nor must we pass the dark purple of the sloe, or the intense black of the privet fruit, which looks so handsome. We used the word pome a little above; it is another form of carpel, well illustrated in the familiar apple or pear. We have it too in the rosy fruit which still hangs over-head on the branches of the wild crab—cut one across, the core which contains the seeds is tough and horny, it does not separate from the flesh of the fruit like the stone of the peach or cherry, but is closely connected to it, forming the pome (Anglice, apple fruit) of the botanist. Apples and nuts are always companions. If the boys and the squirrels have left us a specimen of the latter, we see another form of fruit, the nut kind, and for once we get a designation less scientific than usual. Alas!

"November's sky is chill and drear,"

and November days are short—we must not then linger too long with damp grass, and damp air, without warm sunshine. We might speak of the podded fruits, but must refer for them to the recollections of green peas and beans. The form of pod, moreover, well illustrates the connexion traceable

between the simple leaf of the plant and the after complex form of the fruit. Then we have what are often called pods, but are not true pods, the seed-vessels of the *cruciferæ*, such as the wallflower, shepherd's purse, whitlow grass, &c. Call to mind that when you open a pea-pod, it splits both back and front, and discloses its one cavity of pea-seeds; when you attempt to open a ripe wallflower seed-vessel, it opens by two valves from below upwards,—and you will find the little flat seeds are contained in two cavities, separated by a transparent central partition. The wallflower seed-vessel is a *Siliqua*. See December.

DECEMBER.

"What, cold December barrenness everywhere!"

"The dead leaves strew the forest walk,
And wither'd are the pale wild flowers;
The frost hangs blackening on the stalk,
The dew-drops fall in frozen showers."—BRAINARD.

AFTER the month of April, Flora's treasures came upon us so thick and fast, that we could no longer afford space for those directions in practical botanizing—drying, collecting, &c.—which commenced our papers of the earlier months. True, we had almost concluded our observations when the mode of mounting the dried plants was explained; but there yet remains something to be said respecting the final arrangement and disposal of the specimens. We mentioned that one species of plant only should be placed on the same half-sheet of paper; there is,

however, no objection, particularly in the case of small plants, to more than one specimen of the same species being shown, especially if the characters of the plant are better illustrated by this being done. One specimen may exhibit the leaves and flowers to advantage, while another more advanced presents us with the developed seed-vessels. In the case of large plants, you must use your discretion in selecting flowers, leaves, portions of stems, roots, &c., endeavouring to include as many of the characteristic features of the species as possible in the compass of your half-sheet. If long and slender plants, like the grasses, &c., have been bent and rebent upon themselves, as directed in the paper for March, you may be able to introduce the entire specimen, though many times longer then your paper; in other cases you may effect the preservation of valuable characters by bending the parts, as in the case of the runners of such plants as the strawberry, or common bugle.

Having fixed your specimens, the next step is to attach to each its name, both specific and generic—that is to say, if your specimen be a ranunculus, you write that word on the upper right-hand corner of the half-sheet. That is the generic or genus name of the plant; but as there are many other species of ranunculus, it is necessary to attach the specific or species name of the particular specimen, before our designation is complete. Thus, suppose our plant is the common water-crowfoot, we add to the first written name "ranunculus," the specific name "aquatilis," which to a botanist distinguishes that species from every other plant in the vegetable

kingdom. These are the botanical and scientific Latin designations; beneath them it is usual to write the English name, and the place where and date when, the particular specimen was gathered —adding, if you have received the dried specimen from a friend, the friend's name also. Thus, then, we have in our right-hand upper corner the following:—

"*Ranunculus aquatilis,*
Common water-crowfoot,
River Trent—May 20th, 1853."

These names may be written either on the paper itself, or on a label which can be gummed on the paper. Having thus mounted your species, the next step must be to arrange them under the heads of their respective genera; in other words, to put the different *species* of the same *genus* together. This is best done by including the half-sheets to which the different species are attached within the cover of one whole sheet which contains the genus, writing the name of the genus, whether it be ranunculus, veronica, or any other, on the left-hand upper corner of the sheet, adding, if you think well, the name of the natural order to which the genus belongs, or, if you follow the Linnæan method, the class and order in that system. Thus, it would be —*Ranunculus.*

Nat. Ord. *Ranunculaceæ.*

or, *Ranunculus.*

Class *Polyandria*—Ord. *Polygynia.*

Having done this, your specimens may be put away in some dry place. It is better to have them

arranged on shelves—if you can afford a little cabinet for them, so much the better—at all events, have them arranged and in order, even if your arrangement be no more than alphabetical. It ought, however, to be something more scientific than this. The Linnæan method of classification and arrangement you will find most easy for study and practice at first; but the natural classification of plants will give you the most clear and satisfactory view of the domains of the vegetable kingdom. These directions respecting the naming and arranging of plants are not unimportant. If the specimens are worth gathering and drying, they must be worth preserving; and if they are to afford any satisfactory use or amusement, they must be in order. Moreover, the position on the paper we have pointed out as proper for the names, will be found the most convenient for reference. Lastly, in looking over or showing your plants, be careful not, as many do, to turn over the sheets as you do the leaves of a book, otherwise you will certainly injure your specimens. Lift each specimen half-sheet carefully with both hands, and lay it smoothly down on the one which preceded it.

Twice blessed, surely, is our botanical pursuit; for not only has it given us a new interest in the fields of summer, given us enlarged and deeper views of the wisdom, the power and the goodness of the Almighty, but it now offers pleasing and profitable occupation for our leisure time in winter, when—

> "There's not a flower upon the lea,
> The frost is on the pane;"

and in looking over or arranging the dried but still beautiful forms of our herbarium, we live over again, in thought, the pleasant rambles and companionships of summer; it may be of summers long fled, of companions whose forms we shall no more see on earth. Well, arranging our herbarium is a most pleasant occupation for bad days, and for winter evenings; but we must not neglect out of doors for all that.

Last month we had our gay bright berries dropt as with diamond or crystal, when the November dew or rain which had gathered upon them sparkled in some chance ray of the watery sunshine. This month we have them set in the silver frost-work of the rime. How handsome look

> "The clustered berries bright
> Amid the holly's gay green leaves,"

when contrasted with the white crystalline hoar frost, on a clear winter morning. True berries are they withal, and contain four little seeds. Berries, too, are the dull black and brown fruits of the ivy, that seem to clothe so comfortably the leafless trees. Holly—Ivy—Mistletoe! The last gives us a change of colour, and its white semi-transparent berries supply us with the pearls we wanted for Flora's jewelled winter crown. Let us have a list of her casket's contents. Her rose garland of summer has now furnished the heps of all shades of colour, from pink to brilliant red, and even to the deep black-purple fruit of the thorny burnet-rose, or *Rosa spinosissima*. Next, how varied are the bramble berries, which we have shown are not berries at all; there is the deep black, telling of ripeness,

of our common blackberry; the red of the rock bramble (*Rubus saxatilis*), the orange red of the mountain cloudberry, a handsome wreath would they make. Next come our opaque coral-like fruits, the haws of the thorn, the scarlet rowan bunches of the mountain ash, and those of our friend the holly; after these, we have the waxen drupe-like fruit of the yew, and the wax-like berries of the guelder rose, followed by the transparent reds, such as the honeysuckle, or the woody nightshade more deeply tinged with orange, or the bryonies. And again come we to the mistletoe pearls. Should Flora mourn the vanished flowers, the fate of the "gentle sisterhood," many a funereal-looking fruit have they left for her adorning. The buckthorn and the elder, the spurge laurel, the privet, the sloe —black berries all of them—and many another, might well be used as emblems of mourning. Truly our winter crown almost equals in brilliancy the summer's floral tiara; but we must not let it eclipse, not let it cause us to forget, some of the more sober-hued seed products that awaits us. The dry seed-bunches of the ash or of the maple or elm, popularly called "keys," offer us an example of what is called in botany a samara, that is a simple carpel or achene, one portion of which is extended into a wing-like appendage—Fig. 161. We have already spoken of

Fig. 161.

the *nut* of the hazel, which we find partially covered

by the involucre or husk. Nuts, too, are the acorns, and their cups so celebrated in the table arrangements of fairy-land, are simply the involucre of the nut consolidated. Very similar in character are these twin three-cornered beech nuts. Both beech tree and oak, as well as the hazel, belong to the *Cupuliferæ*, or cup-bearing tribe, which also includes the Spanish chestnut—a tree, moreover, which is claimed as a British native. In the chestnut the nuts, one or two together, are contained within the well-known prickly case formed by the enlarged involucre. How different from these well protected nuts are the naked seeds of the cone tribes; except for the partial covering of the cone scale at the base of which it lies, the cone seed is completely exposed. The cone, well known to all as yielded by the fir and pine trees, being made up of a number of these scale-covered seeds, comes under the class of what are called collective fruits, like the mulberry. In a few species of the cone tribe, however, the scales, instead of being hard and dry, are succulent and fleshy. Such is the case of the juniper—Fig. 162—its fruit, usually called the *juniper berry*, is actually a little cone in construction. At one period another description of seeds were classed as naked seeds, by botanists. Those of our readers who have been using their eyes, must have observed in the flowers of the borage order, and more especially in the labiate plants, that what appeared to be the seeds, were situated—two or four together—at the bottom of the calyx. So like are these to simple seeds, that they were formerly considered so: but now

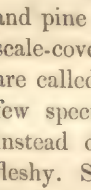


Fig. 162.

they are known to be seed and seed-vessel combined. They are, in short, achenes, like those of the composite and umbel-bearing plants. Almost could we —when at a little distance—imagine that yonder tall reed grass by the pond still bore some handsome blossom, grass though it be; but nearer examination shows us that the appearance is caused by the silky hairs attached to the flower heads, if we may so speak. The appearance is really ornamental, and the grass itself reminds us that we have yet to speak of the nature of those seeds, the most important of all perhaps, the cereals, or grains. Almost they come under the definition of an achene; but in the grasses, the seed-covering, or testa, which in wheat forms the bran, is very intimately connected with the true seed itself; to this combination of seed and seed-covering the name *caryopsis* has been given by botanists. Hitherto, we have regarded seeds as inclosed in and connected with the *carpels*, or seed-vessels, in which they have been grown and perfected; if we trace them beyond this, to the stage of their dispersion, we find the modes by which that dispersion is effected, and by which the germs are separated from their containing seed-cups, for deposition in the earth, as varied as the forms of the seed-cups themselves. No department of botanical investigation is more interesting than this. So numerous and so beautiful are the different contrivances which aid these tiny rudiments of the future flower, or shrub, or forest tree, in spreading themselves over the earth. Some offer to us the feathery wing, like the dandelion, the willow-herb, &c.; others, like the gorse or broom, have their

seeds projected to a distance from the parent plant, by the sudden bursting and spring-like twisting of the two valves or sides of the containing legume or pod.

Many of our readers, indeed, must have remarked this fact for themselves, when, under the heat of a July sun, their wanderings have led them through some

> "Path with tangling furze o'er-run,
> When bursting seed-bells crackle in the sun;"

and they have wondered what could be the meaning of the incessant crack, crack, which seemed momentarily to occur on every side, as if some fairy folk were firing *feux de joie* to celebrate the fine weather. Verily, too, the tiny soldiers, whoever they be, seem to have loaded with something more than powder; for, after each crack, the attentive ear might catch the sound as of dropping shot among the leaves. At last the eye detects one of the black pods of the broom or of the gorse in the very act of firing; in one moment each pod valve has twisted itself into a spiral, and sent its seed, the fairy projectiles, scattering all around. And thus there is an explanation of the fairy fusillade; but we find out that spring-guns are in use in Flora's kingdom instead of Minié rifles.

The little seed of the wood-sorrel has its own special elastic envelope, to send it forth upon the world; the hooks of the burdock cling to the passing animal, and are carried, perhaps, miles away: while the screw-like appendages of the crane's-bill achenes assist to roll them to some chink in the earth, and then screw them into it. Again, some seeds never separate from their containing carpels. As we have

before explained, what we call the *seeds* of the dandelion, of the caraway, carrot, or buttercup, &c., are both seed and seed-cup combined; they fall to the ground however, or are sown as seed simply; so also with the grains, with the nut tribes, &c. Again, many of the succulent fruits fall fruit and seed, or seeds, together. A large proportion, however, of seed-vessels have some peculiar mode by which they permit the escape of their enclosed treasures. The poppy has little pores at the summit of the seed-cup, the lychnis tribes open at the top by teeth or valves. —See November, Fig. 152—the pimpernel splits off a little lid, and discloses its well-hoarded treasury—Fig. 163—while the cruciforms, like the wall-flower,

Fig. 163.

Fig. 164.

quietly lift up their sides—Fig. 164—to let the seeds fall; the willow herbs opening at top in elegant fashion, to permit their beautifully arranged and winged germs to take their flight.

But truce to science and to long names, for Christmas is coming on, and all we have now to do with leaves, and berries and fruits, is to deck the home and to spread the board in remembrance of the time and mission of Him

> "That to the cottage as the crown
> Brought tidings of salvation down."

What cheerfulness do the leaves and fruits of winter add to the Christmas decorations when festivities are abroad; and when more serious thoughts engage the mind, and the retrospect of the past year is undertaken, fain would we hope that the hours spent beneath the leaves of the summer trees, and in search for the summer flowers, will not be found amid the least profitable, nor be amid the least pleasantly remembered. "Consider the lilies of the field," were the words of Him whose birthtime we now celebrate: consider their "array," and their "glory," for truly

> "There is a lesson in each flower,
> A story in each stream and bower;
> In every herb on which you tread
> Are written words, which, rightly read,
> Will lead you from earth's fragrant sod
> To hope, to holiness, and God."*

If such be the uses to the mind and heart of the study of the wild flowers, which He who made, and bade us "consider" them, has scattered without stint, in their beauty and fragrance, "o'er hill and dale and desert sod," cease not to care for them; think not that the interest is exhausted in one short year or summer, for with each succeeding season it will revive, the old friends will be welcomed, and scarcely can you fail to make new ones; for even the quickest

* Davis.

botanical eye overlooks, at times, some plant or other —perhaps the very one sought after—which another year it detects at once. Then, again, in every neighbourhood fresh plants will appear year by year, carried thither by some of the means proper of plant transport, or disclosed by some fresh-turned soil; it may be some new railway embankment introduces quite a novel society in the vegetable world of your district. Nay, even if you should find no new plant, you cannot in any ordinary leisure exhaust the study of those which deck even the most scantily furnished flora. Discard not the most humble weed, the most neglected flower, for it is a mine of beauty—

> "I'll teach thee miracles! walk on this heath
> And say to the neglected flower, 'Look up
> And be thou beautiful!' if thou hast faith
> It will obey thy word."*

Ay, have faith that there exists not the work of God's hand without beauty; and truly, in confirmation, says another one of the sweetest of our poets,—

> "There's beauty all around our paths,
> If but our watchful eyes
> Can trace it midst *familiar things*
> And through their lowly guise."†

But why should we try to persuade? we know there is not one who has once imbibed the love of our wild flowers, and their gatherings, who will willingly drop the pursuit.

Wild Flowers,—we have yet a few plants unnoticed, which cannot be classed amid the flowers, for blossoms they have none, yet are they amongst the most ornamental of our native plants. One more paper do we propose on the fern tribes ere we say adieu.

* Barrington. † Hemans.

THE FERN TRIBES OF PLANTS.

"Where the copsewood is the greenest,
Where the fountain glistens sheenest,
Where the morning dew lies longest,—
There the Lady Fern grows strongest."

Our Wild Flower papers hitherto have dealt with flowers only; that is, with such plants as display—whether in gay dresses or without them, it matters not—the little organs, called stamens and pistils, all these being classed under the somewhat break-jaw name of *Phænogamous plants*, that is, plants provided with organs distinctly adapted to the formation of true seeds. In this class nearly all the higher forms of vegetable life are included; but there yet remains that large department of vegetable existence arranged under the head of *Cryptogamia*, which crowned as it were by the ferns of temperate climes, and by the fern trees of the tropics, descends to the utmost verge of vegetable life, till it is lost in plants of microscopic minuteness, consisting of little more than a simple cell or vesicle of vegetable matter. Do not fear,—we are not going to plunge you into a maze of fungi, mosses and such-like; but, be assured, the few higher cryptogamia to which we guide your attention will well repay the trouble of their investigation.

Many of our readers must know the ferns, or brackens, at least the commoner species,—all must remember their beautifully cut leaves and elegant forms, which graced the banks and woods and rocks

of June, in their greenest richness; albeit, remember as they may, they will not be able to connect any flower with these beautiful leaves; and therein lies the reason why these wild plants—but not flowers—came not among our "Wild Flower" notices, but are brought under consideration in a distinct paper. These fern plants have no flowers, they have no organs, such as the stamen, the pistil, &c., of the flower proper, and even their spores, by which they chiefly propagate, are not true seeds. Notwithstanding all this, the ferns are at times no mean plants; witness some of the tropical and southern zone "tree-ferns," the perfection of graceful beauty and stateliness; nay, even our own royal fern, or "flowering fern," as it is sometimes called—the *Osmunda regalis*—is not an insignificant member of the family—but more of this anon. Let us get a fern and examine it, and then shall we better appreciate the ins and outs of the family. Here is the common male fern—(*Aspidium Filix mas*)—so frequent and yet so beautiful an ornament of our moist shady banks and woods; its green, very green, and much-cut fronds growing generally in a circle, and rising to the height of two, three, or even four feet. Observe in spring, when the young fronds are rising, how remarkably the springing leaf is folded, coiled as it were upon itself; this folding of young leaves generally is called their "vernation," and in the case of the fern, the peculiar form of vernation is named "gyrate" or "circinate"—Fig. 169—1—it is well worth examination; mark, too, how profusely scaly these young fronds are. This scaliness, so characteristic of the ferns, becomes proportionably less

on the more matured frond; but still you may observe it, especially on the "rachis" as the central rib of the fern leaf is called. You gather a mature frond, and find on the back a multitude of little roundish raised dots—Figs. 165, 166—and here, if

165. Back view of a portion of the frond of an Aspidium, showing *sori*—1—covered by a circular *indusium* or involucre.

166. Back view of a portion of the frond of the male-fern, showing *sori*—1—covered by a kidney-shaped *indusium* or involucre.

there are no fern flowers, there is at least the "fern seed," so famed in superstition of yore, for its reputed power of rendering the possessor invisible, provided the seed had been gathered with all due ceremony upon the eve of St. John. However, "fern seed" is not seed in the botanical sense, but "spores;" moreover, these roundish dots, or *sori*, are not the seed spores, but only the coverings of the vessels or capsules—Fig. 167—which contain the minute spores. In the case of the male shield fern—Fig. 166—which we are now examining, these spore spots have a covering, involucre, or, as it is often called, "indusium," of a kidney-shape; in other species it is perfectly circular or shield-shaped—Fig. 165—in others oblong, and we shall find that in others of the fifty species of British ferns, it is either wanting or

167. Magnified view of spore containing capsules of a fern, showing their elastic jointed rings—2.

its place is supplied by the folding of the leaf margin —Fig. 168; as already said, these involucres are neither the seeds, or rather spores, nor are they the seed-capsules or vessels. The latter lie beneath the involucre, many together, but they are so minute that you will not be able to make out their structure without the aid of a good magnifier or small microscope. They are worth some trouble, however, on account of the beautiful little elastic jointed ring— Fig. 167—by which each is surrounded, and which serves the purpose of a spring to tear the capsule membrane transversely asunder, when its spore contents are ripe. All these parts you will make out in the "male shield fern" we have chosen for examination, and you must also observe the peculiar veining, "venation," which marks the fern frond. Hold one up to the light, and you cannot fail to notice how each vein, shortly after leaving the midrib from which its starts, becomes forked. Connected with this venation, we find the spore clusters of the plant, and founded upon it we have distinctions of value. Only the root remains for examination; this you will find varying to a foot in length, bearing the knobby remains of the old leaf-stalks, and very scaly. This root is famed, and justly so, as a remedy in cases of worms.

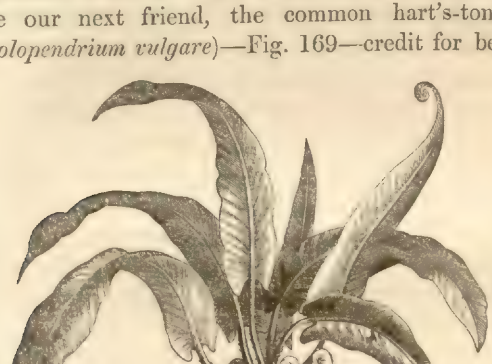
168. Portion of frond of Maiden's-hair fern, the *sori*—1—covered by the reflexed margin of the frond.

Having once examined our common male fern, our readers will find little difficulty with others of this

interesting and extremely beautiful tribe of plants, that is, as regards understanding their general structure, though we fear a general description will afford small guide to the discrimination of many of the individual species. However, there is one we cannot fail to recognise, as it shoots up its young curled fronds in May and June, by the side of hedge or wood, or even by the stony moor, or on the otherwise bare hill-side. When full-grown, a goodly thicket does this, the common bracken—*Pteris aquilina*—make, sending its branched fronds five or six, or even eight or ten, feet high, and offering its "bracken curtain" to the deer for his evening couch; one, moreover, which will conceal even the well-antlered buck, and which has concealed many an armed Highlander in days of yore. The readers of Sir Walter's "Lady of the Lake" cannot fail to call to mind how Roderick Dhu's men sprang from the "bracken" at the whistle of their chieftain. You *must* know the bracken fronds which rise from the long creeping root, or rhizome, and which, instead of bearing their spores like the male shield fern, in round "sori," arranged on the back of the frond, have them placed on the under margin, the *revolute* edge of the leaf forming their covering. Should you go fern-gathering in the North, you will find the same arrangement in the case of the common rock-bracken or brake, or "curled rock brake" (*Cryptogramma crispa*), a much smaller plant than the last, generally growing among loose stones on the hills, and ornamenting the waste rock places. This fern has had so many names that it might puzzle a young botanist:—First it was *Os-*

munda crispa, then *Pteris crispa*, then *Cryptogramma*, and now it has settled into *Allosurus crispus*. Never mind these names, however, but look for the plant, when you have the chance, amid the rocky debris at the base of the Cumberland or southern Scottish hills, where its bright green relieves the grey tints of the stones.

Almost we fear that ferns and cut leaves are so associated in our readers' minds, that they will scarce give our next friend, the common hart's-tongue (*Scolopendrium vulgare*)—Fig. 169—credit for being



169. Hart's-tongue fern. The young fronds—1—unfolding by a *gyrate or circinate vernation.*

a fern at all, until they turn the back of the frond, and find its spores disposed in long lateral *sori* which follow the veinings of the leaf. The hart's-tongue fern grows in bunches of long plain leaves, somewhat crisped at the edges, and occasionally a little cut at the extremity. It is extremely ornamental,

and its often drooping fronds, though generally shorter, not unfrequently attain a length of a couple of feet; you will most likely fall in with it in a shady, somewhat damp situation; indeed few ferns will you find that do not fix themselves where moisture is abundant, often where they are continually wet by the spray of a waterfall. Some of the most elegant—elegant is the word generally appropriate to ferns—are found in these places, and often add much to the beauty of the scene. Look for the little green-stemmed Spleen-wort (*Asplenium viride*) in such situations; you will know it by the tiny oval scarcely cut leaflets, which are arranged on either side of the green rachis, or central stem, forming one of the prettiest little fern fronds we know; the prettiest, certainly of the numerous family of spleen-worts, now, at least, since the elegant—no other word will do—lady fern has been lost to them by its transference to the genus *Athyrium*. These spleenworts vary considerably in appearance, but all have oblong or linear sori. Some prefer the moist clefts of rocks for their root fixtures, and one the cliffs of the sea-shore. We spoke of the "lady fern" (*Athyrium Filix fœmina*), sometimes called the "Queen of Ferns," so graceful are its drooping much-cut leaves. In many a shaded glen or wood, but also on moor and moss land, does her queenship hold her court, and much more abundant and universally distributed is she than her consort, the king of the tribe, the royal *Osmunda regalis*, or Osmund royal, often called the "flowering fern," from the fact of its bearing its fruit, or "fructification," on a kind of flower-like prolongation of the summit of its stately frond, to

the height of seven or eight, or at times even of eleven feet. A magnificent and right royal fern this is, and a real ornament, wherever, as on the banks of Killarney, in Ireland, it deigns to grow abundantly. Many another species of this interesting tribe of plants might we name, some, such as the common polypody of frequent occurrence on wall-tops, banks, &c., presenting the capsules of sori without covering; others less frequently met with, such as the bladder ferns, some of the spleenworts, &c., whilst others are of extreme rarity. We must not forget, however, one species of fern not very commonly met with in this country, but one which, when found, cannot fail to attract the eye, from the delicate growth of its branched-looking fronds—Fig. 168.—It is the maiden's-hair fern (*Adiantum Capillus Veneris*), dwelling on moist rocks in sea-shore neighbourhoods. Scarcely is it possible in a *general* description of the fern species, to afford to our readers appreciable distinctive marks for each; may we hope that enough has been said to show that the members of this elegant and graceful tribe, though undecked by gay flowers, are no less interesting than those plants which are; nay, we might add, no less beautiful. May we recommend them to your attention in the coming summer's rambles; they will then speedily recommend themselves, and become, we doubt not, some of the most prized and ornamental specimens of the dried collection, or Herbarium or hortus siccus, by whichever name you may call your preserved, and we trust *well-preserved* and *well-arranged* acquisitions.

A few first cousins have our friends the ferns, in

the shape of adder's-tongues, club mosses, horse-tails, &c., some of which cannot be passed by; interesting, curious, and not unhandsome are they, and deserving of a few words at our hands. The adder's tongue—Fig. 170—is by no means uncommon in shaded moist places, or even in meadows, though often overlooked, notwithstanding its somewhat singular appearance; its fructification—springing in a

170. Common adder's-tongue. The fructification—1—borne as a spike.

171. The common moonwort. The fructification borne in clusters.

compact spike from the ovate frond; still more remarkable looking, the moonwort—Fig. 171—bears globe-like clusters of capsules elevated above the half-moon-shaped divisions of the frond. This little

plant you may probably find in your wanderings over the dry stony moor or upland pasture ground. Many wonderful properties were ascribed to plants in olden times, but this little moonwort seems to have surpassed most in its marvellous powers; not only was it said to unlock doors if put into the key-holes, but even to draw the shoes off the horses' feet if they trod upon it. In situations similar to those in which we find the moonwort, we may look for the handsome club-moss, *Lycopodium*.

The common species, *Lycopodium clavatum*, or common club-moss, or wolf's-claw, or "stag's-horn," —for it is known by all these names—can scarce escape you, for it is very general on the hills even of comparatively lowland districts. The stem of the club-moss runs along the ground, often for many feet, throwing up at intervals the spiked heads, which contain the spores or germs under the cover of the scale-like leaves. So ornamental is this plant, that it has been used even to decorate a fancy dress for the ball-room, the long trailing stems and projecting spikes forming very graceful festoons. When the heads or spikes of this and of other species of club-moss are dry, they yield a fine yellow powder, which is almost as inflammable as gunpowder; and one of the species, the *Lycopodium Alpinum*, or savin-leaved club-moss, is employed by Icelanders to dye cloth yellow.

Scarcely less curious than the club-mosses, are the horse-tails or equisetums.

In some of your spring walks, either you have met, or you may meet with, on some pasture ground, or even road side, a queer-looking plant, which seems

quite inexplicable by your ordinary botanical lore. There is an erect, loose, very hollow, somewhat succulent, pink-looking, jointed stem, crowned by a blackish head, which you think may have something in connexion with the ordinary form of flowers; but you examine it, and find nothing to which you can give a name: the head appears divided into numerous scale-like divisions, and that seems all. And it is all: the head is the fructification or spore-bearing organ of the fertile spike of the common corn horse-tail, (*Equisetum arvense*), the spores being formed on the under side of these scales. This, remember, is the fertile spike, very different in appearance from the much branched, rough, and furrowed barren spike, which you will find occupying its place some weeks later. This marked distinction between the fertile and barren spikes exists in two other species of these plants which are found in Britain; one is a rare one, the other is the great water horse-tail, an inhabitant, and certainly an ornamental one, of pools and river sides generally, where it throws up its fronds—for they share this name with the ferns—to the height of three or four feet. Other species of equisetum are there, in which the difference between the barren and fertile frond is much less marked, the principal being the possession of the spore-bearing spike or head. The whole tribe of the horse-tails have a rough harsh feel, owing partly to the large amount of siliceous* matter contained in their cuticle; and from this property they are much employed for purposes of polishing both wood and metal.

Much more might we say of these curious plants,

* Flint earth.

of their spores furnished with peculiar hygrometric appendages, &c.; indeed, much more might we say of these interesting forms of vegetable life which have been so lightly and slightly touched upon in the foregoing chapter, did such extended information come within the scope of our design. This it does not; but we trust our readers who have gone with us the year through, will not fail to seek it from higher sources for themselves. We have but tried to offer them a few glimpses of Nature's most beautiful floral kaleidoscope, in the hope that having a few times turned it round before their eyes they may be tempted to go on and turn it round for themselves.

But we gave our exhortations and said our adieus last month with the closing year, and this we may only wish them a "New Year" of many happy rambles, when bright skies, warm air, and springing flowers once more bid the flower-gatherers, whether children or sages, be up and doing, and wooing Nature; for

> "Nature never did betray
> The heart that loved her: 'tis her privilege
> Through all the years of this our life to lead
> From joy to joy; for she can so inform
> The mind that is within us, so impress
> With quietness and beauty, and so feed
> With lofty thoughts, that neither evil tongues,
> Rash judgments, nor the sneers of selfish men,
> Nor greetings where no kindness is, nor all
> The dreary intercourse of daily life
> Shall e'er prevail against us, or disturb
> *Our cheerful faith that all that we behold*
> *Is full of blessings.*"

A FEW WORDS

ON THE

ECONOMIC PROPERTIES OF BRITISH WILD PLANTS.

It is often remarked, that we bring from abroad, both for medicinal and economical use, many vegetable productions in no way superior in the qualities for which they are prized to numbers of those which are the spontaneous growth of our own soil; and the fact of our doing so is thought to be explained by the sort of artificial value which many persons are said to attach to foreign articles, according to the old adage, that "far-fetched fowls have fine feathers." Perhaps there may be some foundation for the accusation of neglecting home produce: we suspect, however, that the principal reason why our native wild plants which possess valuable qualities are neglected, is that labour is too valuable in this country to be profitably employed in their collection. Even if tea itself grew wild amongst us, we doubt whether, supposing it to be gathered and prepared according to the Chinese elaborate manipulation, it would not be found cheaper still to depend upon the celestials for our supply than to collect and manufacture it for ourselves. It seems as if the only way in which a vegetable product, either native or originally foreign, can be produced successfully in this country, is to cultivate and gather it regularly in such

a wholesale fashion as we do in the case of the hop, and some of the more largely-used medicinal herbs, such as chamomile, &c. As, however, this method is inapplicable to the generality of our own wild plants, they are neglected, fall into disuse, or at least become the property of the country herbalist, or of the housewives in remote districts. Nevertheless, some acquaintance with their properties is not only interesting, but may be useful.

One group more especially claims our attention, from being composed of plants which, under the ameliorating influence of cultivation, have become valuable and much-prized vegetables. It is singular how many of these are derived from the sea-shore. First, we have the well-known celery (*Apium graveolens*), so mild and succulent when well grown, but which is a disagreeably strong-flavoured and stringy plant in its native salt marshes. Following this comes its no less prized neighbour the sea-kale (*Crambe maritima*), a grower in the sand; and not far from it the origin of our garden-cabbages, the *Brassica oleracea*. The sugar-yielding beet too (*Beta maritima*) comes from the muddy shores of our own islands, and to the list we must add the delicate asparagus (*Asparagus officinalis*). So profusely does this latter plant grow on one island off the coast of Cornwall, that the name "Asparagus Island," has been given to the place.* In addition to these sea-side natives, we have the parsnip (*Pastinaca sativa*) the carrot (*Daucus carota*), and the ancestor of the turnip (*Brassica campestris*). Cultivation, to be sure, has made a wide difference between the wilding and the

* Hooker and Arnott's Brit. Flora.

well-raised vegetable, but still they are essentially the same, and, except for the unceasing care of the cultivator, the latter would inevitably degenerate to its original condition. Moreover, some of our wild plants are used as vegetables, even when uncultivated. We were going to instance the nettle, so highly prized as a dietetic spring vegetable in some districts, but we remember that its cultivation has been immortalized by Sir Walter, and that Andrew Fairservice, the old gardener of Lochleven, did raise early nettles under hand-glasses. However, though the nettle is not generally so highly honoured, its young spring shoots are said to be no bad substitute for spinach. For a similar purpose, the mercury goose-foot (*Chenopodium Bonus Henricus*), and sometimes the "shepherd's purse" (*Capsella bursa pastoris*) is also used. Indeed, there are many others of our wild plants, such as the sow-thistle, &c., the leaves of which when young, if cooked like spinach, are said to be equally good. Where the hop grows plentifully, its young shoots cooked like asparagus are by no means a despisable vegetable.

Next we have of our own plants to which may be traced some of our most prized fruits. The common cherry and the morello both claim ancestry from wild trees (*Prunus avium* and *Prunus cerasus*) of our woods and hedge-rows, likewise the pear must go back to the *Pyrus communis*, and the apple to the *Pirus malus*, the well-known crab-apple. The currants, black and red, and the gooseberry, are all to be found growing beyond the bounds of cultivation: but it is doubtful whether they are truly wild. Not so the strawberry (*Fragaria vesca*) which nowhere carries a

finer flavour than on the woodland bank. Next comes our raspberry, introducing us to all its kindred the brambles, with their fruit, black, orange or red, as the case may be; and from these we pass to the pleasant-flavoured bilberries of our woods and hills, and to the cranberry of excellent tart reputation. Add to these our hazel nuts, and a very respectable dessert we make of our true British natives. Another set of native plants supplies us with condiments. Mustard we have from the common black mustard (*Sinapis nigra*), horse-radish (*Armoracia rusticana*), parsley (*Petroselinum sativum*), water-cress (*Nasturtium officinale*)—all British. The common lettuce is not a British native, but the dandelion, when cultivated as in France, is said to be palatable. The salad burnet (*Poterium sanguisorba*), resembling cucumber in flavour, is eaten as a salad. The "samphire of the rock" also affords us one of the best of pickles. A few roots there are which are used sparingly or in particular districts. Some of the British orchideæ yield the salep* of commerce, and the root-tubers of the arum or cuckoo-pint are collected and prepared for sale. The root of the *Campanula rapunculoides* was formerly cultivated under the name of ramps. In the Highlands of Scotland the root of the bitter vetch (*Orobus tuberosus*) is said at times to constitute an article of food, and the tuber of the common pignut (*Bunium flexuosum*) is eaten by children and pigs whenever they can get it. We may add to these the roots of the "silver weed," *Potentilla anserina*, which are eaten in some parts of the country, either roasted or boiled.

* Salep is used in the preparation of a mucilaginous jelly like arrow-root.

The uses of the seeds of the flax-plant (*Linum usitatissimum*) are too well known to require comment. The seeds of the yellow flag, or common iris, have been substituted, when roasted, for coffee; those of the common buck-wheat (*Polygonum fagopyrum*) are used as food. The mucilaginous properties of the mallow tribe generally, and especially of the common mallow (*Malva sylvestris*) place them, perhaps, as much among the medicinal as among the economical plants. From linseed and from mustard, oils, valuable as commercial commodities, are procurable in large quantity.

In the way of aromatics our British wild plants supply us largely; the greater proportion, however, being derived from the two extensive families of the umbel-bearing and of the labiate plants. In the umbelliferæ, the aromatic properties are developed chiefly either in the roots or in the seeds, but also in the stems, as in the case of the common Angelica, the stalks of which are used as a candied confection. The root of the gout-weed (*Ægopodium*), of the meum or spignel, and of the sea-holly (*Eryngium*), have all of them been held in esteem for their aromatic stimulant properties. In the list of aromatic seeds it is sufficient to enumerate the caraway, the coriander, and the fennel, although many more, less known than used, but belonging to the tribe, might be cited. In all these, the aromatic property is due to the presence of the essential oil which is contained in the little channels or vittæ which are excavated, as it were, in the substance of the seeds. In the labiate family, the aromatic essential oil is much more generally distributed over the plant than in the umbel-bearers,

being found in the leaves, stem, flowers, &c. Such we find to be the case in the various species of mint, including such well-known aromatics as pennyroyal, peppermint, spearmint, &c., also in thyme, marjoram, wild bazil, sage, &c., all of which are true British labiates. To our list of aromatics we should add the juniper and the sweet-sedge (*Acorus calamus*). Other plants have we which combine with their aromatic a bitter principle, and thus become partly medicinal. Such is the hop—a pleasanter bitter medicine, moreover, than most others, and one which combines with it much aroma. The same we find in the common germander, a labiate, said to have been at times substituted for the hop. In the family of the composites we have many such instances, but they belong rather to our medicinal section.

As we might expect, in former times, ere home-spun yarn and home-made clothing had been rendered obsolete by wholesale manufacture, the dyeing properties of our native plants were much more valued, and more generally known and employed, than they now are. Some, indeed, are named from their possession of such properties; such are the *Genista tinctoria*, or dyer's greenweed, a leguminous plant yielding a yellow, and the *Isatis tinctoria*, or dyer's woad, yielding a blue dye. Likewise the common dyer's rocket, or yellow weed (*Reseda luteola*), which also gives a yellow. The stems of the white water-lily (*Nymphæa alba*) have a reputed agency for a grey, and other plants for a black dye. The lycopus, or gipsy-wort, is said to derive its English name from being employed by the wandering tribe to stain their skins of a dark colour; the

root of the yellow flag yields a black; the berries of the privet are said to dye a fine and permanent green, and marjoram tops a purple. The *Potentilla tormentilla*, or tormentil, one of the commonest of our heath plants, is said by Sir W. Hooker to be used in Lapland to stain leather red; and, according to the same authority, the Icelanders form an improved yellow dye by mingling the leaves of the bog whortleberry (*Vaccinium uliginosum*) with those of the savin-leaved club-moss. Our native astringents are chiefly claimed by the rosaceous tribes; some of these plants have been found specially adapted for the tanning of leather. For this purpose the root of the *Potentilla tormentilla*, or common tormentil, has been largely employed. The tanning process likewise, besides the well-known oak bark, derives aid from our two native trees the birch and the alder, and the root of the common bracken has been applied to a similar use.

We must not forget among our chemicals, either, the saltwort (*Salsola*), and glasswort (*Salicornia*), of our sea-shores, which yield soda largely, and which may be made available in the manufacture of glass, of soap, &c.

If we look among our native British plants for mechanical capabilities we find them numerous, even excluding the timber which some of our trees yield so largely and so well. From the flax (*Linum usitatissimum*) we have its fibre; from the rushes the well-known materials for mats, chairs, lights, &c.; the willow finds us baskets; the teazel, the best agent for dressing our cloth; the holly, wood for engraving and for the art of the turner. From

the horse-tail genus (*Equisetum*) we have an admirable agent for polishing brass, &c., in the rough epidermis laden with flinty matter, which, it is said, the dairymaids in Northumberland use to scour their milk-pails.* The lyme grass (*Elymus*), by binding the sands of our shores together with its roots, assists in the resistance to the encroachments of the sea, and the sea-reed (*Ammophila arundinacea*) not only does the same, but gives its stems or culms for the formation of table-mats and baskets. The purple molinia is said to be twisted into ropes for their nets by the fishermen of the Isle of Skye. The uses of the common reed, so handsome an ornament of our lakes and streams, are well known to thatchers, and to the layer of the plaster floors so commonly met with in some places. But if we are to go on enumerating the uses of our grasses, we never shall have done. We must not forget the sweet gale, or Dutch myrtle, of our bogs, the twigs of which are used to make beds, nor the hard useful wood of the hornbeam (*Carpinus betulus*); neither the elegant and fragrant birch, of which the sap will afford a wine like the palm-toddy of more southern climes, and the twigs our most useful brooms. And after all these, and many more we might enumerate, of the good and useful properties of our British vegetable products, we must call to mind the woods —the holly so prized by the engraver, the heart of oak, unrivalled as our wooden bulwarks, the beech, the ash, the elm, and many more. Then come the holly and the thorn to fence our gardens and fields, and the box, the thrift, and even the heather, to

* Hooker's Flora.

edge our garden plots. We cannot, however, part with the "blooming heather" in this short way, as if it was fit for nothing but to edge garden plots. Do not its tops and seeds feed the grouse, and its flowers the bees? and does not the pulled heather make the most luxurious couch? and does it not yield to the Highlander fuel for his fire, thatch for his dwelling, and dye for his yarn? Surely, we must apologize to our favourite heather. Food for our cattle, yielded especially by our grasses and leguminous plants, such as the clovers, vetches, &c., we must not enter into, lest we find ourselves in a subject requiring a volume instead of one which must be confined to the concluding lines of a last chapter.

OUR MEDICINAL NATIVE PLANTS.

WERE we to include in our list every plant which has had some medicinal virtue imputed to it, we must begin at the commencement of the Flora, and go straight on to the end; for, from the chickweed and groundsel, which enter into the composition of the fomentations and poultices of the village nurse, up to the valuable but powerful foxglove and nightshade, which must be cautiously used, even by the medical man, we find nearly every weed and wild flower invested with some reputed properties. A certain number of our native plants are recognised by medical men, and included in what is called the Pharmacopœia, or list of accredited medicinal agents. Many, however, even though thus noticed, are neglected, perhaps undeservedly so; a few only are much employed and prized as powerful remedies in the treatment of disease.

The order of the Ranunculaceæ, in addition to the *Ranunculus acris*, or upright meadow crowfoot, and *Ranunculus flammula*, or lesser spearwort, both of which are used as irritants or blistering agents to the skin, affords us the hellebores, at one time in much repute in mania and affections of the head, and the dangerous aconite, which has of late years been used in rheumatic affections; all these plants well sustain the character of the family for violent and acrid properties. Next have we the poppy

tribe, the common red poppy (*Papaver rhæas*) yielding the colouring matter of its brilliant petals; the opium poppy (*Papaver somniferum*) its milky juice, which, when dried, is our opium, perhaps the most useful, most merciful medicine known to man. The opium poppy, however, cannot be claimed as a British native, although now it has become in some districts so thoroughly naturalized as to take rank with our wild plants. There is no doubt that this plant first came from the East—Persia or Asia Minor. It is chiefly cultivated in Britain for its capsules, or "poppy-heads," so much used in fomentations; and excellent opium has even been made in this country, but not profitably. It is a curious circumstance connected with the poppy, that although the seed-vessels or capsules contain the opium juice so largely, the seeds within them are perfectly bland, and even agreeable in flavour, and are in some places used as food.

The medicinal plants native to Britain, obtained from the cruciferous order, are not in high repute for their activity. The scurvy-grass (*Cochlearia officinalis*) has been esteemed chiefly as a counter-agent to a diet too exclusively composed of animal food; the horse-radish and black mustard, as stimulants; the common cuckoo-flower (*Cardamine pratensis*) for its pungent bitterness. Leaving the crucial flowers, we find that from the blossoms of the sweet-scented violet a syrup is made, which partakes of the odour and colour of the petals, and which is much used as a simple domestic remedy in the ailments, coughs, &c., of young children: moreover, the root of the violet possesses emetic properties. Next we have the linseed and the mallows, both valuable for their

demulcent properties; and the pretty little wood sorrel (*Oxalis acetosella*) offering its trefoil leaves to make a pleasant acid drink for the parched lips of fever—its acid, the oxalic, being the same as that of the garden rhubarb. The common broom (*Sarothamnus scoparius*) stands high, and deservedly so, as a remedy in dropsy. It is remarkable as the only native medicinal plant we draw from the important order of the Leguminosæ, or pod-bearing tribe. Passing to the rose tribe, we find the plants it presents us, the common avens (*Geum urbanum*), the tormentil (*Potentilla tormentilla*), and the dog rose (*Rosa canina*)—of which the heps are used for a conserve—all serviceable on account of the astringent principle so characteristic of the order to which they belong. For the same property, however, the tall handsome loosestrife (*Lythrum salicaria*) of our August water sides, has found a place in the list. We noticed the aromatic properties of the caraway, fennel, coriander, angelica, and other members of the umbel-bearers, in our last chapter, and need not refer to them again; but we must not omit mention of their relative, the hemlock (*Conium maculatum*), a powerful poison, but a soothing medicine in proper hands. The common elder (*Sambucus ebulus*) has a reputation rather domestic than in the domains of legitimate medicine; its leaves, which are slightly astringent, being used in the composition of an ointment, and the distilled water of its flowers as an aromatic. Valuable and powerful, but by no means agreeable, the root of the common valerian (*Valeriana officinalis*) is much employed as a stimulant in nervous derangements.

Chamomile (*Anthemis nobilis*), wormwood (*Artemisia absinthium*), tansy (*Tanacetum vulgare*), and taraxacum, or dandelion (*Leontodon taraxacum*), all give the bitter principle of the composite plants; the first three, strongly, in combination with the aromatic, the last in a milder form, but the most valuable of the four, extremely valuable in liver, stomach, and dropsical affections. To the same family we are indebted for the strong-scented lettuce (*Lactuca virosa*), of which the milky juice is often used as a substitute for opium. But the old ladies will not forgive us if we forget the coltsfoot (*Tussilago farfara*), another composite, of such ancient repute in chest complaints that its very name is derived from "tussis," the Latin word for a cough. Of the essential oils of the labiates, the mints and the marjoram, we spoke in our last chapter; but, like the coltsfoot, the horehound (*Marrubium vulgare*) will surely get us into disgrace for its ommission, for it, too, is widely celebrated as a pectoral. Both plants have this virtue—that if they do not do good, they certainly do not much mischief. Foxglove (*Digitalis purpurea*), a member of the figworts, notwithstanding its handsome appearance, is badly thought of, popularly, as dangerous, and not without reason, and yet it may take its place beside the most valued medicines the wide world over. It has been used domestically, but it must have been improperly, in Ireland, as a remedy in epilepsy. Our next order, the Solaneæ, or nightshades, is a highly medicinal one; the bitter-sweet (*Solanum Dulcamara*), the belladonna, or deadly nightshade (*Atropa Belladonna*), the thorn apple (*Datura stramonium*),

and the henbane (*Hyoscyamus niger*), are all members of it: the first, the bitter-sweet, is employed to promote perspiration after cold, its use in this respect having even been highly regarded by Linnæus; the remaining three are either poisons, or valuable soothers of pain and irritation, according to their employment. The great water dock (*Rumex aquaticus*) is one of the many medicines which, from having been rated too highly, has perhaps fallen into unmerited neglect. In affections of the skin, it has been, and is still, frequently employed. Its relative, the common sorrel (*Rumex acetosa*) contains oxalic acid, like its namesake the wood-sorrel, and may, like it, be employed to make an acid drink in fever. These plants belong to the buck-wheat tribe, which also offers the astringent root of the bistort (*Polygonum bistorta*); neither require we to travel far for another astringent, for we have it abundantly in the bark of our native oak (*Quercus robur*). The leaves of the asarabacca (*Asarum Europæum*), when dried and powdered, are used as an irritant snuff in headache, and it is also said that their infusion is a useful stimulant when applied to the head, to prevent the hair from coming off. The aromatic bitter of the hop, the bitter principle of the willow-bark, by some thought almost to rival quinine; the turpentine and pitch of the fir, the essence of the juniper, and the worm-root of the male fern (*Aspidium filix mas*), are all true British products, and not less so the valued colchicum of the autumn crocus (*Colchicum autumnale*), well deserving the blessings of those who suffer from tendency to gout.

MEDICINAL NATIVE PLANTS CHIEFLY EMPLOYED POPULARLY.

A goodly list, truly, have we of plants, included in the authorized resources of the medical man; but many more might we add from the unauthorized stores of domestic medicine. Perhaps those plants which possess sensibly bitter properties, and which are used to make what are popularly called "bitter teas," are more employed than any others. One of the most noted of these, the common agrimony (*Agrimonia Eupatoria*) had formerly much repute as a remedy in ague, before the improved drainage of the land had driven that disease from many districts in which it formerly prevailed. But, although the ague is gone, the agrimony has still much credit as a bitter. Chamomile, tansy, and wormwood, from among the composites, are also used, and, where it grows, the buck-bean (*Menyanthes trifoliata*), one of the gentian tribe. This plant, indeed, well deserves its place among our recognised medicines, for it is an excellent bitter; so also is its relative, the pretty pink-flowered centaury (*Erythræa centaurium*), another of this gentian family, which, indeed, is characterized generally by bitterness. In addition to bitters, the composites furnish the herbalist with other equally esteemed remedies. The butterbur (*Arctium lappa*) has a repute in malignant fevers; the coltsfoot, as a pectoral, we have already alluded to; the yarrows possess irritant properties. Of one, the sneeze-wort

yarrow (*Achillæa ptarmica*), the leaves, powdered and dried, are used as a snuff in head affections, and from another, the common yarrow or milfoil, an astringent ointment, useful in some cases, is made in the Scottish Highlands. The *Matricaria Parthenium*, another composite, and also a bitter, derives its name of Feverfew from its reputed efficacy; and the pretty cowslip is highly esteemed in many parts of the country in cases of measles, a tea being made of the dried flowers or "pips." The aromatics derived both from the umbelliferous and labiate families are, as we might expect, much employed domestically; we have already sufficiently alluded to them. One of the bedstraw genus, the common goose-grass (*Galium aparine*), or, as it is called in some places, scurvy-grass, is held in much respect by the country herbalists as a "purifier of the blood," and, indeed, lately, attempts have been made to introduce it into the regular practice of medicine as a remedy in affections of the skin. Occupying a similar position, esteemed popularly, and valued by some medical practitioners, we have the wall pennywort (*Cotyledon umbilicus*) as a remedy in epilepsy. Of *it*, the author has reason to speak most favourably from his own experience. Some plants have a reputation for efficacy in internal bleedings, as in spitting of blood: such for instance as the adder's-tongue (*Ophioglossum vulgatum*), and the common nettle, the fresh juice being employed. The leaves of our water friend the arrow-head (*Sagittaria sagittifolium*) are applied to burns and scalds, and those of the common or broad-leaved dock (*Rumex obtusifolius*) are put to

the same use, and to dress blisters. The curious green-flowered Herb Paris has also enjoyed much fame as an application to wounds, second only in reputation to the well-named golden rod—*Solidago vergaurea*—also called "Aaron's rod"—which was at one time imported from abroad for surgical purposes, &c. So we might go on enumerating virtues, supposed or real, attached almost to every weed that grows.

That the value as medicinal agents attached to some of our native plants is perfectly legitimate, there can be no doubt, and perhaps it would be well if our native herbal received a little more attention, and underwent a more searching investigation at the hands of the medical profession; but equally certain is it that a large proportion of plants, herbs in popular esteem, owe their reputation to garbled tradition and old superstition, such as that which connected them with occult influences, and often to the most fanciful associations of certain supposed resemblances between parts of the plant and the disease it was held to cure. Such we find in the case of the knotted figwort (*Scrophularia nodosa*) which was esteemed a remedy in scrofula, because the knotted appearance of the root was thought to resemble the enlarged glands of the disease. The lesser celandine is an instance of a similar idea.

But our Catalogue is long enough. If our readers take the botanical walks which we hope they will do, they will almost certainly fall in at times with some of the professed herb gatherers,

who, except in the case of certain, supposed, valuable secrets, will always talk about "the herbs," &c., and their many virtues, altered and improved by the position and influences of the moon and stars at the time of gathering, and such like "folk-lore." To these representatives of bygone times, and repositories, sometimes, of odd scraps of information, we refer the curious.

THE END.

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